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BUREAU OF HYGIENE & TROPICAL DISEASES
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Municipality of Singapore

Health Department

ANNUAL REPORT
for
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BUREAU OF HYGIENE
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7 SEP 19
& TROPICAL DISEASES

MUNICIPAL HEALTH OFFICE

Singapore, 27th March, 1931.

The President,
Municipal Commissioners,
Singapore.

Sir,

I have the honour to submit my report for 1930.

I. ZYMOTIC DISEASE.

1,579 cases were notified compared with 1,713 in 1929 and 1,520 in 1928.

The following table shows the comparison between the year under review and the previous ten years.

Year	Enteric Fever	Diphtheria	Chicken-Pox	Puerperal Fever	Erysipelas	Cerebro-Spinal Fever	Paratyphoid Fever	Small-Pox	Plague	Cholera	Typhus Fever	Scarlet Fever	Tuberculosis	Total
1920 ..	129	33	68	15	1	29	2	4	61	33	—	—	520	895
1921 ..	127	49	119	13	11	70	4	150	28	1	—	—	319	891
1922 ..	68	52	127	16	7	32	2	268	39	1	—	—	169	781
1923 ..	63	37	188	12	14	9	1	3	52	—	—	—	409	788
1924 ..	64	38	230	22	9	16	—	9	20	11	—	—	331	750
1925 ..	136	51	31	14	2	10	2	10	59	1	—	—	365	681
1926 ..	197	46	169	25	14	6	1	34	7	22	1	1	642	1,165
1927 ..	235	29	193	22	5	17	7	19	4	30	—	—	733	1,294
1928 ..	230	59	350	11	8	15	12	9	5	9	1	3	808	1,520
1929 ..	133	57	577	13	8	3	—	9	3	—	—	6	904	1,713
Average for 10 years ..	138.2	45.1	205.2	16.3	7.9	20.7	3.1	51.5	27.8	10.8	.2	1.0	520.0	1,047.8
1930 ..	156	63	349	11	9	22	2	—	—	—	—	2	965	1,579

The following table shows the incidence by nationalities.

	Europeans	Eurasians	Chinese	Malays	Indians	Others	Total
Enteric Fever ..	7	7	114	6	20	2	156
Diphtheria ..	5	6	40	5	1	6	63
Chickenpox ..	3	18	56	11	260	1	349
Puerperal Fever ..	—	—	7	2	2	—	11
Erysipelas ..	2	—	5	1	1	—	9
C. Spinal Fever ..	—	—	12	—	10	—	22
Paratyphoid Fever ..	1	—	1	—	—	—	2
Smallpox ..	—	—	—	—	—	—	—
Plague ..	—	—	—	—	—	—	—
Cholera ..	—	—	—	—	—	—	—
Typhus Fever ..	—	—	—	—	—	—	—
Scarlet Fever ..	1	—	1	—	—	—	2
Tuberculosis ..	6	17	701	66	170	5	965
Total ..	25	48	937	91	464	14	1,579

The following return shows the number notified for each month of the year:—

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Enteric Fever ..	14	11	7	7	8	8	17	22	11	17	15	19	156
Diphtheria ..	3	7	2	1	6	4	—	6	9	4	17	4	63
Chickenpox ..	8	25	47	27	20	17	23	23	26	47	61	25	349
Puerperal Fever ..	—	—	—	3	—	2	1	—	—	2	2	1	11
Erysipelas ..	—	—	—	—	2	—	1	2	3	—	1	—	9
C. Spinal Fever ..	2	—	5	1	1	2	5	1	3	1	—	1	22
Paratyphoid Fever ..	—	—	—	—	—	—	—	1	—	—	1	—	2
Smallpox ..	—	—	—	—	—	—	—	—	—	—	—	—	—
Plague ..	—	—	—	—	—	—	—	—	—	—	—	—	—
Cholera ..	—	—	—	—	—	—	—	—	—	—	—	—	—
Scarlet Fever ..	1	—	—	1	—	—	—	—	—	—	—	—	2
Tuberculosis ..	59	82	98	93	92	78	80	83	87	71	61	81	965
Total ..	87	125	159	133	129	111	127	138	139	142	158	131	1,579

The outstanding feature of these returns is the fact that no case of Cholera, Smallpox or Plague was notified during the year, which is a record for the city. We are to be congratulated on our luck.

Rat trapping, which had been suspended for two years, was, in accordance with international regulations, recommenced. 4,290 rats were dissected in the laboratory, and all were free from plague. 502 of these came from the Port area and ships at the wharves whilst the remainder were trapped in town. The average flea infestation per rat was found to be 1.4. After the first few months the identification of fleas was discontinued it being found, as in previous years, that X. cheopis is practically the only rat flea present.

Experiments carried out in the Laboratory by Dr. Gilmour tend to prove that strains of Plague bacilli recovered from local cases decrease very rapidly in virulence. Passage through local rats results in decreased virulence showing most probably that the local rat possesses a high degree of immunity. Interested readers are advised to study Dr. Gilmour's report which is appended.

TYPHOID AND PARATYPHOID FEVERS.

158 cases, of which 2 only were paratyphoid, were notified. But 102 deaths were registered from this cause. In other words comparatively few of the total infection were notified. Most likely they never even came under the notice of a medical man. Allowing for a 20% mortality rate the 102 deaths would represent at least 500 cases. Such a number in a corresponding municipal area at home would be the subject of serious thought and much uneasiness.

The number of notifications varied from 7 in March to 22 in August. At no time was there any sign of even a localised epidemic.

This year the cases were closely followed up and investigated, but only in two instances could any two cases be said to be connected with each other.

In guessing at the reason for this prevalence I can only repeat as in previous years that with a water supply which is above reproach, a milk supply which is 95% tinned, we must search elsewhere for the source of infection and method of transmission. In the absence of flies we are driven to conclude that the "filthy fingers," especially of the irresponsible and ignorant hawkers, who are allowed to prepare food for the public in insanitary dwellings and hawk it on the streets, are not guiltless.

TUBERCULOSIS.

Only 965 cases were notified but 1,622 deaths were reported. Comment is superfluous. There must be many thousands of cases at any one date in Singapore.

DIPHTHERIA.

63 cases were reported. Here again I feel certain this number far from represents the true incidence of the disease.

During the year the practice was continued of examining a throat swab in all cases of deaths of children under 10 years of age—children who had not been seen in life by any medical man. 1,098 such swabs were examined and in 43 or approximately 4% the Diphtheria bacillus was recovered in culture.

22 of the children were under 1 year of age 21 from 1 to 6 years. 37 were Chinese and 6 Malays. The actual certified causes of death were Convulsions 12, Bronchitis 9, Pneumonias 5, Gastritis and Gastro-entritis 6, Dysentery 4, Malnutrition 3, Tuberculosis 3 and Influenza 1. In this of course there is no scientific proof that the cause of death was Diphtheria but the figures are significant. No attempt was made to follow up these results and until that has been done it would be unsafe to deduce overmuch. To get even a throat swab requires a good deal of tact and we have therefore refrained from disturbing people even more by following up the result of the swab. At the same time it should be possible and is advisable to carry the investigation a little further and swabs will be taken on subsequent investigations from other persons in the house. It will be of value too to obtain swabs from a representative number of presumably healthy children of the same age.

The positive swabs were evenly distributed throughout the year and were from all over the town. They seemed to have little or no connection with each other.

CEREBRO SPINAL MENINGITIS.

There were 22 cases in all, scattered throughout the year. Except for 3 cases, which occurred in Queen Street in different houses, and in 3 consecutive months, no possible connection between cases could be established.

GENERAL.

(1) Medical inspection of Passengers.

64 permits to land were granted to 110 passengers 11 of whom failed to report.

(2) Disinfection of infected articles.

3,402 articles were disinfected. The steam disinfector was used on 23 occasions.

(3) Houses quarantined and disinfected.

Only one house was quarantined. 361 houses (Phthisis cases 231) were disinfected.

(4) Infected persons and contacts.

241 persons were removed to Middleton Hospital, 4 bodies were removed for autopsy, and 34 bodies buried under supervision.

II. MIDDLETON HOSPITAL.

At the end of 1929 there were 15 patients remaining in hospital while during the year under review there were 577 admissions making a total treated of 592. Of these 548 were discharged, 33 died while 11 remained in hospital at the end of the year. 15 of the deaths were due to Cerebro Spinal Meningitis and 7 to Diphtheria. There were 10 cases of laryngeal diphtheria of whom 6 required tracheotomy.

The report of the Medical Officer is appended.

III. VACCINATION.

The following vaccinations were reported.

	Successful	Modified	Failed	Not seen	Total
Municipal Vaccinators ..	8,706	37	97	532	9,372
Private Vaccinators ..	1,671	1	4	3	1,679
Medicalmen ..	2,416	1	4	—	2,421
Total ..	12,793	39	105	535	13,472

Of the total number of 9,372 vaccinations performed by the Municipal Vaccinators, 98.9 of those seen for the second time, were successful.

The nationalities of those vaccinated were:—Europeans 12, Eurasians 116, Chinese 7,617, Malays 1,021, Indians 446 and Others 160. Of these 4,822 were males and 4,550 females of the following ages:—

Under 1 year of age	8,097
Between 1 and 2 years	384
,, 2 ,, 5 ,, ...	353
,, 5 ,, 10 ,, ...	298
,, 10 ,, 20 ,, ...	60
Adults	180
	9,372

At Municipal Vaccination depots there were performed 6,543 vaccinations, at Police Stations 2,190, in houses 425, Telok Ayer Clinic 67, Jalan Besar 121 and of contacts 26.

IV. VITAL STATISTICS.

The following statistics are calculated on an estimated mean annual population of 495,818 made up as follows:—

	Males	Females	Total
Europeans	3,272	1,593	4,865
Eurasians	2,970	3,362	6,332
Chinese	249,685	139,627	389,312
Malays	23,368	21,111	44,479
Indians	34,355	7,324	41,679
Others	5,089	4,062	9,151
Total ..	318,739	177,079	495,818

The following return gives the population, the number and rates per 1,000 births, infantile deaths, and deaths at all ages for the past 10 years:—

Year	Population	Births		Infantile Deaths		Deaths at all ages	
		No.	Rate	No.	Rate	No.	Rate
1920	330,303	8,969	27.15	2,233	248.9	11,731	35.51
1921	351,461	10,237	29.12	2,383	232.7	11,947	33.99
1922	362,597	10,368	28.59	2,488	239.9	11,553	31.86
1923	373,513	10,757	28.79	2,431	225.9	10,049	26.90
1924	384,758	11,757	30.55	2,614	222.3	10,420	27.08
1925	396,341	12,363	31.19	2,600	210.3	11,184	28.21
1926	408,273	12,871	31.52	2,987	232.0	13,085	32.04
1927	428,153	14,152	33.05	3,221	227.6	14,165	33.08
1928	442,454	15.540	35.12	3,142	202.1	12,584	28.44
1929	479,723	17,551	36.58	3,467	197.5	12,575	26.21
Average for 10 years	395,757	12,466	31.16	2,756	223.9	11,929	30.33
1930	495,818	17,702	35.70	3,877	219.0	13,748	27.73

I. BIRTHS.

The total number of births registered during the year was 17,702 compared with 17,551 in 1929 and 15,540 in 1928.

There were 9,249 males and 8,453 female births.

The birth rate was 35.70 per mille as compared with 36.58 in 1929 and 35.12 in 1928.

The following return gives the number of births and the birth rate for each month of the year.

MONTH	Births	Birth Rate	MONTH	Births	Birth Rate
January	1,453	35.17	July	1,446	35.00
February	1,319	31.92	August	1,458	35.29
March	1,518	36.74	September	1,501	36.33
April	1,454	35.19	October	1,625	39.33
May	1,514	36.64	November	1,530	37.03
June	1,415	34.25	December	1,469	35.55

The following return shows the number of births for each nationality.

	Males	Females	Total
Europeans	77	72	149
Eurasians	92	100	192
Chinese	7,548	6,691	14,239
Malays	924	949	1,873
Indians	480	505	985
Others	128	136	264
	9,249	8,453	17,702

There were 483 Still Births compared with 547 in 1929 and 507 in 1928.

II. DEATHS.

The total number of deaths for the year was 13,748 and the death rate 27.73 per 1,000 compared with 26.21 in 1929 and 28.44 in 1928.

730 persons died who had been less than 3 months resident in Singapore. Deducting these the death rate is reduced to 26.26.

The excess of births over deaths was 3,954.

The following return shows the number of deaths and the death rate for each month of the year:—

MONTH	Deaths	Death Rate	MONTH	Deaths	Death Rate
January . .	993	24.03	July . .	1,248	30.20
February . .	844	20.43	August . .	1,161	28.10
March . .	1,018	24.64	September . .	1,193	28.87
April . .	1,106	26.77	October . .	1,168	28.27
May . .	1,377	33.33	November . .	1,181	28.58
June . .	1,428	34.56	December . .	1,031	24.95

The death rate for the different nationalities were:—

	1930			1929		
	Males	Females	Total	Males	Females	Total
Europeans	10.70	10.67	10.69	10.63	9.88	10.38
Eurasians	17.51	16.95	17.21	17.28	13.83	15.45
Chinese	30.07	26.29	28.71	28.57	24.95	27.29
Malays	31.32	29.65	30.53	26.60	25.78	26.21
Indians	20.52	36.46	23.32	19.22	36.11	22.18
Others	9.63	7.39	8.63	17.26	11.76	14.85
Total . .	28.49	26.36	27.73	26.95	24.86	26.21

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1930.

I. General Diseases.			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
1. Enteric Fever,	1a. Typhoid Fever.		..	..	..	1	1	..	..	1	1	..	9	3	19	2	37	7	13	2	1	1	1	..	..	..	M F	82 17	99
	1b. Paratyphoid fever.		..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	M F	0 3	3
2. Typhus Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
3. Relapsing Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
4. Mediterranean Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
5. Malaria.			6	..	9	9	27	31	21	25	20	8	77	18	178	20	380	62	247	47	133	35	34	14	..	2	M F	1,132 271	1,403
6. Small-pox.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
7. Measles.			..	..	1	..	1	3	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	3 3	6
8. Scarlet Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
9. Whooping Cough.			..	1	1	2	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 4	5
10. Diphtheria.			..	..	..	2	4	4	1	4	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	M F	5 12	17
11. Influenza.	11a. With pulmonary complications.	(1) With pneumonic complications.	4	3	7	5	7	4	2	1	..	1	1	1	1	4	2	3	5	..	4	1	4	3	..	..	M F	37 26	63
		(2) With other pulmonary complications.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	11b. Without pulmonary complications.	(1) With non-pulmonary complications.	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
		(2) Without stated complications.	3	2	11	14	13	11	2	1	2	2	5	2	6	2	9	7	6	2	8	3	7	8	..	..	M F	72 54	126
12. Miliary Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
13. Mumps.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward .	13	6	30	33	53	54	26	33	23	12	92	25	204	29	428	79	272	52	146	40	46	25	..	2			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1930.

I. General Diseases—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	13	6	30	33	53	54	26	33	23	12	92	25	204	29	428	79	272	52	146	40	46	25	..	2			
14. Asiatic Cholera.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
15. Cholera nostras.			..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
16. Dysentery,	16a. Amœbic.		..	..	..	..	..	..	..	..	..	..	..	3	3	..	23	..	29	1	18	..	12	1	..	..	M F	85 5	90
	16b. Bacillary.		..	..	..	..	..	..	..	..	1	..	..	..	9	..	17	..	26	2	20	..	21	..	..	..	M F	94 2	96
	16c. Other or Unspecified.		..	..	5	1	7	5	5	3	1	5	8	1	12	11	35	16	48	22	66	20	47	27	..	..	M F	234 111	345
17. Plague,	17a. Bubonic.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	17b. Pneumonic.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	17c. Septicæmic.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	17d. Not otherwise defined.		..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
18. Yellow Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
19. Spirochaetosis ictero—haemorrhagica.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
20. Leprosy.			..	..	..	..	..	..	..	..	..	..	..	..	1	..	2	2	4	..	3	..	1	..	..	..	M F	11 2	13
21. Erysipelas.			..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	1	..	..	M F	2 2	4
22. Acute Poliomyelitis,	(1) Acute poliomyelitis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Acute poliœncephalitis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
23. Encephalitis lethargica.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
24. Meningococcal meningitis.			..	..	1	..	..	..	1	2	..	..	3	..	1	..	11	..	..	..	1	..	..	..	..	..	M F	18 2	20
		Carried forward ..	13	7	36	34	60	59	32	38	25	17	103	29	230	40	517	97	379	77	254	60	128	54	..	2			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1930.

I. General Diseases—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	13	7	36	34	60	59	32	38	25	17	103	29	230	40	517	97	379	77	254	60	128	54	..	2			
25. Other epidemic and endemic diseases,	(1) German Measles.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Varicella.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(3) Other diseases included under 25.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
26. Glanders.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
27. Anthrax.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
28. Rabies.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
29. Tetanus.			27	19	..	..	..	..	2	..	3	..	1	..	3	2	2	1	4	..	2	..	..	..	..	..	M F	44 22	66
30. Mycoses.	(1) Actinomycosis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other mycoses.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	M F	2 0	2
31. Tuberculosis of the respiratory system.			..	..	2	..	5	10	6	2	2	2	13	10	80	35	284	94	334	81	328	71	118	21	1	..	M F	1,173 330	1,503
32. Tuberculosis of the central nervous system.			1	..	4	2	7	2	3	3	..	1	..	..	4	..	3	1	1	..	2	..	1	..	..	..	M F	26 9	35
33. Tuberculosis of intestines and peritoneum.			..	..	..	..	..	1	1	..	..	..	1	..	..	..	..	1	4	2	..	..	..	..	..	..	M F	6 4	10
34. Tuberculosis of vertebral column.			..	..	..	..	..	..	1	1	..	..	..	..	..	..	2	..	1	..	1	..	..	..	..	..	M F	5 1	6
35. Tuberculosis of joints.			..	..	..	..	1	..	..	..	2	..	1	..	2	..	1	..	..	..	..	..	..	..	..	..	M F	7 0	7
36. Tuberculosis of other organs,	a. Skin and subcutaneous tissues.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Bones.		..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
	c. Lymphatic system		..	..	..	..	1	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 2	3
		Carried forward ..	41	26	42	36	74	72	45	15	32	21	120	39	319	77	809	194	725	160	587	131	248	79	1	2			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1930.

I. General Diseases—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	41	26	42	36	74	72	45	45	32	21	120	39	319	77	809	194	725	160	587	131	248	79	1	2			
	d. Genito-Urinary system.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	e. Other sites included under 36.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
37. Disseminated tuberculosis,	a. Acute.		..	..	..	1	..	..	..	..	..	..	..	..	1	..	1	..	..	..	4	..	..	..	..	..	M F	6 1	7
	b. Chronic or unstated.		3	1	10	4	8	5	5	1	2	2	..	1	..	..	2	1	1	..	1	..	1	1	..	..	M F	33 16	49
38. Syphilis.			17	11	3	6	3	1	1	1	..	1	..	..	2	3	15	8	25	6	26	..	7	2	..	..	M F	99 39	138
39. Soft chancre.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
40. Gonococcal Infection,	(1) Gonococcal infection except ophthalmia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	(2) Gonorrhœal or purulent ophthalmia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
41. Purulent infection, Septicaemia.			4	4	7	4	2	5	..	..	1	1	3	1	8	2	24	..	18	2	20	1	12	..	..	..	M F	99 20	119
42. Other infectious diseases,	(1) Vaccinia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other diseases included under 42.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
II. General Diseases not included above.																													
43. Cancer of the buccal cavity.			..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..	1	..	..	1	..	..	M F	4 1	5
44. Cancer of the pharynx, etc.			..	..	1	..	..	..	..	..	..	..	..	..	..	..	5	2	15	3	31	7	25	7	..	..	M F	77 19	96
45. Cancer of the peritoneum, intestines and rectum.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	5	1	1	..	3	3	..	..	M F	11 4	15
46. Cancer of the female genital organs.			..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	4	..	2	..	9	..	3	..	..	M F	0 19	19
47. Cancer of the breast.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	4	..	3	..	5	..	..	M F	0 13	13
48. Cancer of the skin.			..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	1	1	..	..	M F	2 3	5
		Carried forward ..	65	42	63	52	87	83	51	47	35	25	124	41	330	83	858	210	794	178	672	151	297	102	1	2			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1930.

II. General Diseases not included above—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	65	42	63	52	87	83	51	47	35	25	124	41	330	83	858	210	794	178	672	151	297	102	1	2			
49. Cancer of other or unspecified organs.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	2	8	2	7	4	7	2	..	..	M F	28 10	38
50. Tumours not returned as malignant.			..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	M F	0 2	2
51. Rheumatic Fever.			..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	M F	2 0	2
52. Chronic rheumatism, Osteo-arthritis, Gout,	(1) Chronic rheumatism chronic arthritis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	M F	0 1	1
	(2) Rheumatoid arthritis		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(3) Gout.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
53. Scurvy.			..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
54. Pellagra.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
55. Beri-beri.			2	..	..	..	..	..	2	..	6	3	25	17	100	30	200	43	153	57	104	34	32	10	..	..	M F	624 194	818
56. Rickets.			..	..	1	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 2	3
57. Diabetes.			..	..	..	..	..	..	..	..	..	..	..	..	2	..	2	3	5	2	3	5	9	7	..	..	M F	21 17	38
58. Anaemia, Chlorosis.	a. Pernicious anæmia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	M F	1 1	2
	b. Other anæmia and chlorosis.		..	..	..	..	3	..	2	1	..	..	..	2	..	1	1	4	4	..	2	..	..	..	..	..	M F	12 8	20
59. Diseases of the pituitary gland.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
60. Diseases of the thyroid gland,	a. Exophthalmic goitre.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	M F	0 1	1
	b. Other diseases of the thyroid gland.	(1) Myxœdema.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(2) Cretinism.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward ..	67	42	64	53	90	84	56	48	42	29	149	60	432	114	1,069	262	964	241	788	196	345	122	1	2			

II. General Diseases not included above—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	67	42	64	53	90	84	56	48	42	29	149	60	432	114	1,069	262	964	241	788	196	345	122	1	2			
		(3) Other diseases included under 60b.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
61. Diseases of the parathyroid glands.	(1) Tetany.		..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
	(2) Other diseases of the parathyroid glands.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
62. Diseases of the thymus.			..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
63. Diseases of the adrenals.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
64. Diseases of the spleen.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	2	..	..	..	..	..	..	..	M F	5 0	5
65. Leukaemia, Lyphadenoma,	a. Leukæmia.		..	..	..	..	..	..	..	..	..	..	..	..	1	..	2	..	3	..	..	..	..	..	..	..	M F	6 0	6
	b. Lymphadenoma.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
66. Alcoholism.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	M F	1 0	1
67. Chronic poisoning by mineral substances,	(1) Occupational lead poisoning.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other chronic poisoning by mineral substances.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
68. Chronic poisoning by organic substances.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
69. Other general diseases,	(1) Purpura.		1	2	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 3	4
	(2) Hæmophilia.		..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
	(3) Other diseases included under 69.		..	..	..	1	1	2	..	1	..	..	..	..	..	1	1	..	2	1	2	..	1	..	..	..	M F	7 6	13
III. Diseases of the Nervous System and Sense Organs.																													
70. Encephalitis,	(1) Cerebral abscess.		..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	M F	2 0	2
	(2) Other diseases included under 70.		..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
		Carried forward ..	68	46	65	55	91	87	56	49	42	29	149	60	434	115	1,076	262	971	242	791	196	346	122	1	2			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1930.

III. Diseases of the Nervous System and Sense Organs—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	68	46	65	55	91	87	56	49	42	29	149	60	434	115	1,076	262	971	242	791	196	346	122	1	2			
71. Meningitis.			2	..	6	2	3	4	2	1	..	1	..	1	..	..	4	2	5	..	1	..	..	..	..	..	M F	23 11	34
72. Tabes dorsalis.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
73. Other diseases of the spinal cord.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
74. Cerebral haemorrhage, Apoplexy, etc..	a. Cerebral hæmorrhage,	(1) Cerebral hæmorrhage so returned.	..	..	..	1	..	..	..	..	..	..	1	..	..	..	3	1	5	5	17	8	30	18	..	..	M F	56 33	89
		(2) Apoplexy (lesion unstated).	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	9	3	5	6	..	..	M F	14 11	25
	b. Cerebral thrombosis and embolism,	(1) Cerebral embolism.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1	..	..	M F	2 1	3
		(2) Cerebral thrombosis.	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	1	..	..	..	M F	1 2	3
75. Paralysis of unstated origin,	a. Hemiplegia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	1	1	5	6	..	..	M F	8 7	15
	b. Other forms of paralysis.		..	..	..	..	..	..	..	..	1	..	1	..	..	1	2	..	1	..	3	1	1	3	..	..	M F	9 5	14
76. General paralysis of the insane.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
77. Other forms of insanity.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
78. Epilepsy.			..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
79. Convulsions (non puerperal 5 years and over).			..	..	..	..	..	..	4	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	4 5	9
80. Infantile convulsions (under 5 years of age).			322	223	276	259	121	119	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	719 601	1,320
81. Chorea.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
82. Hysteria and neuritis,	(1) Hysteria, Neuralgia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Neuritis		..	..	..	..	..	..	..	..	..	..	..	..	..	3	1	10	1	4	1	2	..	1	..	..	M F	3 20	23
		Carried forward ..	392	269	347	317	215	210	62	55	43	30	151	63	434	120	1,087	275	986	253	824	211	389	157	1	2			

III. Diseases of the Nervous System and Sense Organs—(*contd.*)			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	392	269	347	317	215	210	62	55	43	30	151	63	434	120	1,087	275	986	253	824	211	389	157	1	2			
83. Cerebral softening.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
84. Other diseases of the nervous system,	(1) Idiocy, Imbecility.		..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
	(2) Cerebral tumour.		..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	1	..	..	..	..	..	..	..	..	M F	1 2	3
	(3) Disseminated sclerosis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	M F	1 0	1
	(4) Paralysis agitans.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	M F	1 0	1
	(5) Other diseases included under 84.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
85. Diseases of the eye and annexa.			..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	M F	2 0	2
86. Diseases of the ear and mastoid sinus,	(1) Diseases of the mastoid sinus.		..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	M F	2 0	2
	(2) Diseases of the ear.		..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
IV. Diseases of the Circulatory System.																													
87. Pericarditis.			..	..	1	..	..	..	..	..	..	..	1	..	..	..	1	..	..	1	3	..	..	..	..	..	M F	6 1	7
88. Acute endocarditis and myocarditis,	(1) Malignant endocarditis.		..	..	..	..	..	..	..	..	..	1	..	..	2	..	3	..	1	..	1	..	..	..	..	..	M F	7 1	8
	(2) Other acute endocarditis.		..	..	..	..	1	..	1	..	..	..	1	1	1	2	3	..	3	2	..	..	..	..	..	..	M F	10 5	15
	(3) Acute myocarditis.		..	..	..	..	..	..	..	..	..	..	..	..	3	..	7	1	14	4	1	..	2	..	..	..	M F	27 5	32
89. Angina pectoris.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	M F	1 1	2
90. Other diseases of the heart,	(1) Aortic valve disease.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	8	..	3	..	5	3	2	2	..	..	M F	18 5	23
	(2) Mitral valve disease.		..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	M F	0 2	2
	(3) Aortic and mitral valve disease.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	M F	2 0	2
		Carried forward ..	392	270	350	317	216	210	63	55	44	33	153	64	442	122	1,111	277	1,008	261	837	214	393	160	1	2			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1930.

IV. Diseases of the Circulatory System—(*contd.*)			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	392	270	350	317	216	210	63	55	44	33	153	64	442	122	1,111	277	1,008	261	837	214	393	160	1	2			
	(4) Other or unspecified valve disease.		..	..	..	..	..	..	..	1	..	2	..	2	1	2	5	4	9	5	18	6	5	9	..	..	M F	38 31	69
	(5) Fatty heart.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	M F	0 2	2
	(6) Dilatation of heart (cause unspecified)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	(7) Other or unspecified myocardial disease.		..	..	..	..	..	..	..	1	..	..	..	..	1	..	4	..	6	..	22	1	10	5	..	..	M F	43 7	50
	(8) Disordered action of heart.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(9) Heart disease (undefined).		..	..	1	2	..	..	..	..	..	..	1	..	1	..	..	1	3	..	1	4	3	1	..	..	M F	10 8	18
91. Diseases of the arteries,	a. Aneurysm.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	5	1	7	1	1	..	..	..	M F	15 2	17
	b. Arterio-sclerosis,	(1) Arterio sclerosis with record of cerebral vascular lesion.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(2) Arterio sclerosis without record of cerebral vascular lesion.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	2	18	5	..	..	M F	24 7	31
	c. Other diseases of the arteries.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	2	..	2	..	..	..	M F	8 0	8
92. Embolism and thrombosis (not cerbral).			..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	5	..	3	1	2	..	1	..	..	M F	1 13	14
93. Diseases of the veins (Varix, hæmorrhoids, phlebitis, etc.)			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	M F	0 1	1
94. Diseases of the lymphatic system.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
95. Hæmorrhage without stated cause.			..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	3	..	..	..	..	..	..	..	M F	4 0	4
96. Other diseases of the circulatory system.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
V. Diseases of the Respiratory System.																													
97. Diseases of the nasal fossæ and annexa,	(1) Diseases of the nose.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Diseases of the accessory nasal sinuses.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0

V. Diseases of the Respiratory System—(*contd.*)			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	392	270	351	319	216	210	63	57	44	35	154	66	446	126	1,122	283	1,041	272	894	231	432	181	1	2			
98. Diseases of the Larynx,	(1) Laryngismus stridulus		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Laryngitis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(3) Other diseases of the larynx.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
99. Bronchitis,	a. Acute bronchitis.		6	7	9	5	2	3	1	..	..	..	..	..	..	..	..	..	..	..	..	1	3	..	..	..	M F	21 16	37
	b. Chronic bronchitis.		..	..	..	1	1	..	..	..	..	..	..	..	..	..	1	..	1	2	3	1	3	..	..	..	M F	9 4	13
	c. & d. Bronchitis not distinguished as acute or chronic.		18	16	77	64	54	57	6	10	1	3	1	..	..	..	2	2	2	1	1	1	9	2	..	..	M F	171 156	327
100. Broncho-pneumonia.			57	45	142	130	164	136	41	22	7	6	9	..	10	2	28	4	23	4	12	3	13	6	1	..	M F	507 358	865
101. Pneumonia, lobar, or not otherwise defined,	a. Lobar pneumonia.		8	5	15	11	10	5	1	2	3	4	6	5	30	2	85	12	77	1	53	6	22	3	..	..	M F	310 56	366
	b. Pneumonia not otherwise defined.		8	7	16	18	38	26	10	11	8	9	20	7	30	7	60	25	69	14	59	13	20	8	..	..	M F	338 145	483
102. Pleurisy,	1 Empyema.		..	..	1	..	..	..	1	..	..	1	..	..	1	..	4	..	2	1	1	..	..	..	..	..	M F	10 2	12
	2. Other pleurisy.		..	..	..	..	1	..	..	..	..	..	..	..	..	..	2	..	1	..	1	1	2	1	..	..	M F	7 2	9
103. Congestion and hæmorrhage infarct of lung.			..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	1	1	..	2	..	..	..	..	..	M F	5 1	6
104. Gangrene of the lung.			..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	2	..	..	1	..	..	M F	2 2	4
105. Asthma.			..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	1	1	3	4	4	2	..	..	M F	9 8	17
106. Pulmonary emphysema.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	M F	2 0	2
107. Other diseases of the respiratory system,	a. Chronic interstitial pneumonia including occupational diseases of the lung.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	2	..	1	1	..	..	M F	4 1	5
	b. Diseases of the mediastinum.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward ..	489	350	611	548	486	437	124	103	63	58	190	78	519	137	1,305	333	1,219	296	1,034	261	509	205	2	2			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1930.

V. Diseases of the Respiratory System—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	489	350	611	548	486	437	124	103	63	58	190	78	519	137	1,305	333	1,219	296	1,034	261	509	205	2	2			
	c. Other diseases included under 107.		..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	2	..	2	..	1	..	..	..	M F	5 2	7
VI. Diseases of the Digestive System.																													
108. Diseases of the buccal cavity and annexa,	(1) Diseases of the teeth and gums.		..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	M F	3 0	3
	(2) Ludwigs angina.		1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	2 0	2
	(3) Other diseases included under 108.		..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	M F	3 0	3
109. Diseases of the pharynx and tonsils,	(1) Tonsillitis. Adenoid Vegetations.		..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 2	2
	(2) Other diseases included under 109.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
110. Diseases of the œsophagus.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	M F	1 0	1
111. Ulcer of the stomach or duodenum,	a. Ulcer of the stomach.		..	..	..	..	..	..	..	..	..	..	..	1	1	..	4	..	1	5	7	..	2	..	..	..	M F	15 6	21
	b. Ulcer of the duodenum.		..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	1	..	..	..	M F	3 0	3
112. Other diseases of the stomach,	1. Inflammation of the stomach.		36	23	52	24	7	11	..	..	..	..	..	..	..	..	..	..	..	2	..	..	2	3	..	..	M F	97 63	160
	2. Other diseases included under 112.		..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	1	..	1	1	3	..	..	..	M F	6 3	9
113. and 114. Diarrhœa and enteritis,	(1) Ulceration of the intestines.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	[illegible]
	(2) Colitis.		2	..	15	7	17	11	..	2	2	1	..	1	..	..	..	..	1	..	..	1	..	..	..	..	M F	37 23	60
	(3) Other diseases included under 113 and 114.		156	141	210	189	97	73	5	5	..	1	..	1	..	..	4	3	5	1	4	4	1	6	..	..	M F	482 424	906
115. Ankylostomiasis.			..	..	..	..	..	..	2	..	..	1	1	..	..	1	2	1	1	1	1	..	..	..	..	..	M F	7 4	11
116. Diseases due to other intestinal parasites,	a. Cestodes, (hydatids of liver excepted).		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Trematodes.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward ..	684	515	888	768	609	533	132	110	65	62	191	81	522	140	1,318	338	1,231	305	1,051	267	519	214	2	2			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1930.

VI. Diseases of the Digestive System—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	684	515	888	768	609	533	132	110	65	62	191	81	522	140	1,318	338	1,231	305	1,051	267	519	214	2	2			
	c. Nematodes other than Ankylostoma.		..	..	2	..	4	..	1	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	M F	8 1	9
	d. Coccidia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	e. Other specified parasites in 116.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	f. Undefined intestinal parasites.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
117. Appendicitis.			..	..	..	..	..	..	..	..	..	1	..	2	2	..	3	1	5	..	2	1	1	1	..	..	M F	13 6	19
118. Hernia. Istestinal obstruction,	a. Hernia.		1	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	2	..	2	..	..	..	..	..	M F	7 0	7
	b. Intestinal obstruction.		1	..	..	1	..	..	1	..	..	..	..	1	..	..	..	..	2	..	1	1	..	..	..	..	M F	5 3	8
119. Other diseases of the intestiness,	1. Intestinal stasis.		1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	M F	2 0	2
	2. Other diseases included under 119.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	2	..	..	..	..	..	M F	3 0	3
120. Acute yellow atrophy of the liver.			..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	M F	2 0	2
121. Hydatid tumour of the liver.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
122. Cirrhosis of the liver,	(a) Returned as alcoholic.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(b) Not returned as alcoholic.		..	..	..	..	..	..	1	..	..	..	1	..	2	..	11	1	19	2	29	6	11	1	..	..	M F	74 10	84
123. Biliary Calculi.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	2	..	2	..	..	..	..	..	M F	5 0	5
124. Other diseases of the liver.			1	1	1	2	1	..	..	..	..	..	1	..	3	2	12	1	6	1	4	1	2	..	..	..	M F	31 8	39
125. Diseases of the pancreas.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	M F	2 0	2
126. Peritonitis without stated cause.			..	1	..	..	..	..	..	..	..	..	4	..	3	..	8	..	10	..	3	2	..	..	..	..	M F	28 3	31
		Carried forward ..	688	517	891	771	614	533	135	110	66	63	197	84	534	142	1,356	341	1,278	309	1,098	278	533	216	2	2			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1930.

VI. Diseases of the Digestive System—(*contd.*)			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	688	517	891	771	614	533	135	110	66	63	197	84	534	142	1,356	341	1,278	309	1,098	278	533	216	2	2			
127.	Other diseases of the digestive system.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
VII. Non-Venereal Diseases of the Genito-Urinary System and Annexa.																													
128.	Acute nephritis. (Including unspecified under 10 years of age).		..	..	..	5	8	9	3	4	1	3	4	3	7	1	12	10	14	9	12	5	3	3	..	..	M F	64 52	116
129.	Chronic nephritis. (Including unspecified over 10 years of age).		..	..	..	..	..	..	2	..	2	4	3	6	10	13	32	31	39	38	103	50	131	49	..	..	M F	322 191	513
130.	Chyluria.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
131.	Other diseases of the kidney and annexa.		..	..	..	..	1	..	..	..	..	..	1	..	..	..	3	1	2	1	4	1	6	1	..	..	M F	17 4	21
132.	Calculi of the urinary passages.		..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	M F	2 0	2
133.	Diseases of the bladder,	1. Cystitis.	..	..	1	..	..	..	..	..	..	..	..	1	..	..	1	..	2	..	3	..	4	2	..	..	M F	11 3	14
		2. Other diseases of the bladder.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	M F	0 1	1
134.	Diseases of the urethra, urinary abscess, etc.,	a. Stricture of the urethra, etc.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	M F	2 0	2
		b. Other diseases of the urethra.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
135.	Diseases of the prostate.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	M F	1 0	1
136.	Non-venereal diseases of the male genital organs.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
137.	Cysts, and other tumours of the ovary not returned as malignant.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	2	..	..	..	..	M F	0 4	4
138.	Salpingitis and pelvic abscess in females,	1. Salpingitis.	..	..	..	..	..	..	..	..	..	..	..	1	..	2	..	1	..	1	..	..	..	..	..	..	M F	0 5	5
		2. Pelvic abscess in females.	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
139.	Tumours of the uterus not returned as malignant.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	M F	0 1	1
140.	Non-puerperal uterine-hæmorrhage.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0

VII. Non-Venereal Diseases of the Genito-Urinary System and Annexa—*(contd.)*		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
	Brought forward ..	688	517	892	776	624	542	140	114	69	70	205	95	551	159	1,405	386	1,337	358	1,222	336	678	273	2	2			
141. Other diseases of the female genital organs,	1. Other diseases of the uterus.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	2. Diseases of the female genital organs not included under other headings.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
142. Non-puerperal diseases of the breast.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
VIII. The Puerperal State.																												
143. Accidents of pregnancy,	a. Abortion.	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	2	..	..	..	..	..	..	..	..	M F	0 3	3
	b. Ectopic gestation.	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	M F	0 2	2
	c. Other accidents of pregnancy.	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	8	..	1	..	..	..	..	..	..	M F	0 10	10
144. Puerperal Hæmorrhage.		..	..	..	..	..	..	..	..	..	..	..	1	..	2	..	12	..	2	..	..	..	..	..	..	M F	0 17	17
145. Other accidents of childbirth.		..	..	..	..	..	..	..	..	..	..	..	1	..	2	..	5	..	1	..	..	..	..	..	..	M F	0 9	9
146. Puerperal sepsis.		..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	6	..	4	..	..	..	..	..	..	M F	0 12	12
147. Puerperal phlegmasia alba dolens, embolism and sudden death,	1. Puerperal phlegmasia alba dolens not returned as septic.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	2. Puerperal embolism and sudden death.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
148. Puerperal albuminuria and convulsions.		..	..	..	..	..	..	..	..	..	..	..	1	..	8	..	10	..	5	..	..	..	..	..	..	M F	0 24	24
149. Childbirth not assignable to other headings (puerperal insanity).		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
150. Puerperal diseases of the breast.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
IX. Diseases of the Skin and Cellular Tissue.																												
151. Gangrene.	1. Senile gangrene, (aged 60 and over).	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	M F	1 0	1
	2. Other gangrene.	..	..	1	..	3	6	1	..	1	..	..	..	1	1	3	..	2	1	2	1	1	..	..	..	M F	15 9	24
152. Carbuncle, boil.		3	1	2	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	5 4	9
		691	518	895	779	627	548	141	114	70	70	205	100	552	175	1,408	430	1,339	372	1,224	337	680	273	2	2			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1930.

IX. Diseases of the Skin and Cellular Tissue—*(contd.)*		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
	Brought forward ..	691	518	895	779	627	548	141	114	70	70	205	100	552	175	1,408	430	1,339	372	1,224	337	680	273	2	2			
153. Cellulitis, acute abscess,	1. Cellulitis.	1	1	3	1	1	..	1	..	..	..	..	..	..	..	2	1	1	..	..	..	1	..	..	..	M F	10 3	13
	2. Acute abscess.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	2	..	1	1	..	..	M F	4 1	5
154. Other diseases of the skin and its annexa	1. Ulcer, bedsore.	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	M F	1 2	3
	2. Eczema.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	3. Pemphigus.	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	M F	1 2	3
	4. Other diseases included under 154.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
X. Diseases of the Bones and Organs of Locomotion.																												
155. Diseases of the Bones,	1. Acute infective osteomyelitis and periostitis.	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	M F	1 1	2
	2. Other diseases of the bones.	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
156. Diseases of the joints.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
157. Amputation.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
158. Other diseases of the organs of locomotion.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
XI. Congenital Malformations.																												
159. Congenital malformations,	1. Congenital hydrocephalus.	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
	2. Congenital malformation of heart.	2	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	3 1	4
	3. Other congenital malformations.	2	6	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	3 8	11
XII. Diseases of Early Infancy.																												
160. Congenital debility, sclerema and icterus,	1. Congenital debility and sclerema.	84	102	37	60	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	122 164	286
	2. Icterus neonatorum.	13	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	13 10	23

XII. Diseases of Early Infancy—(*contd.*)			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	1,047	911	938	848	629	551	143	114	70	70	207	100	552	175	1,411	432	1,342	373	1,226	337	682	274	3	2			
	2. Injury at birth.		10	7	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	M F	10 8	18
162. Other diseases peculiar to early infancy.	1. Diseases of the umbilicus.		1	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 4	5
	2. Atelectasis.		23	13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	23 13	36
	3. Other diseases included under 162.		3	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	3 2	5
163. Lack of care.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
XIII. Old Age.																													
164. Old age.	1. Senile dementia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	2. Other forms of senile decay.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	1	250	225	..	..	M F	256 226	482
XIV. External Causes.																													
165 & 166. Suicide by solid or liquid poisons and corrosive substances.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	1	..	..	..	1	..	..	M F	1 3	4
167. Suicide by poisonous gas.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
168. Suicide by hanging or strangulation.			..	..	..	..	..	..	..	..	..	..	..	..	4	1	9	3	15	2	12	1	4	2	1	..	M F	45 9	54
169. Suicide by drowning.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
170. Suicide by firearms.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	M F	3 0	3
171. Suicide by cutting or piercing instruments.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	1	..	3	..	..	..	..	..	M F	6 0	6
172. Suicide by jumping from high place.			..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
173. Suicide by crushing.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
174. Suicide by other means.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
175. Food poisoning.			..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
		Carried forward ..	1,084	937	938	848	629	551	143	114	70	70	207	100	557	177	1,423	437	1,361	376	1,247	339	936	502	4	2			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1930.

XIV. External Causes—*(contd.)*		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
	Brought forward ..	1,084	937	938	848	629	551	143	111	70	70	207	100	557	177	1,423	437	1,361	376	1,247	339	936	502	4	2			
176. Poisoning by venomous animals.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
177. Other acute accidental poisoning (not by gas).		..	..	..	..	..	..	..	..	..	..	1	..	1	1	2	1	..	1	..	1	..	..	..	..	M F	4 4	8
178. Conflagration.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
179. Accidental burns (conflagration excepted).		..	..	..	..	1	3	..	1	..	..	1	..	2	..	3	1	1	1	1	..	..	1	..	..	M F	9 7	16
180. Accidental mechanical suffocation.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
181. Accidental absorption of irrespirable or poisonous gas.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
182. Accidental drowning.		..	..	..	..	2	..	3	..	1	..	2	1	1	..	5	..	7	2	2	1	..	1	..	..	M F	23 5	28
183. Accidental injury by firearms.		..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
184. Accidental injury by cutting or piercing instruments.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
185. Accidental injury by fall.		..	..	2	..	..	2	..	1	..	..	1	..	2	..	6	..	3	..	..	..	..	..	..	..	M F	14 3	17
186. Accidental injury in mining and quarrying.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
187. Accidental injury by machinery.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
188. Accidental injury by other forms of crushing (road vehicles on railways, &c.)		..	..	..	..	..	..	1	2	4	1	..	..	3	..	5	1	6	1	2	1	1	..	..	..	M F	22 6	28
189. Injury by animals (poisoning by venomous animals excepted).		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
190. Wounds of war.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
191. Execution of civilians by belligerent armies.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
192. Hunger or thirst.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	Carried forward ..	1,084	937	940	848	632	556	147	118	75	71	212	101	567	178	1,444	440	1,378	381	1,252	342	937	504	4	2			

XIV. External Causes—(*contd.*)		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
	Brought forward ..	1,084	937	940	848	632	556	147	118	75	71	212	101	567	178	1,444	440	1,378	381	1,252	342	937	504	4	2			
193. Excessive cold.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
194. Excessive heat.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
195. Lightning.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
196. Electricity (Lightning expected).		..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	M F	2 0	2
197. Homicide by firearms.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	..	1	..	..	..	..	..	..	..	M F	7 0	7
198. Homicide by cutting or piercing instruments		..	..	..	..	..	1	..	..	1	1	..	2	1	1	7	..	7	2	..	..	1	..	..	..	M F	17 7	24
199. Homicide by other means.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
200. Infanticide (under one year).		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
201. Fracture (cause not specified)		..	..	..	..	..	..	..	..	..	2	..	..	..	..	4	..	2	..	..	..	..	..	..	..	M F	6 2	8
202. Other and unstated forms of accidental violence, Execution.		..	..	..	..	..	..	..	..	1	..	..	..	3	..	3	..	2	..	..	..	..	..	..	..	M F	9 0	9
203. Violent deaths of unstated nature (i.e. accidental, suicidal &c.) and cause.		1	..	1	..	2	1	1	2	4	1	3	..	6	..	20	1	23	1	15	1	4	2	1	..	M F	81 9	90
XV. Ill Defined Diseases.																												
204. Sudden death.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
205. Cause of death unstated or ill-defined.	1. Heart failure (age 1—70).	..	..	..	..	..	..	..	..	1	..	..	..	1	1	2	1	3	3	2	2	4	..	..	..	M F	13 7	20
	2. Other ill-defined causes.	12	10	21	13	33	39	14	11	3	3	8	3	18	9	31	17	35	17	31	7	38	26	..	..	M F	244 155	399
	3. Cause not specified.	3	2	2	3	2	1	..	1	..	..	..	..	..	..	7	..	7	..	2	..	1	..	5	3	M F	29 10	39
	Total ..	1,100	949	964	864	669	598	162	132	85	78	223	106	596	189	1,526	459	1,458	404	1,302	352	985	532	10	5	M F	9.080 4,668	13,748
		2,049		1,828		1,267		294		163		329		785		1,985		1,862		1,654		1,517		15				

MORTALITY BY NATIONALITIES FOR THE YEAR 1930.

The following return gives the number of deaths from each cause among males and females of the different nationalities. The classification followed is that of the International list (1926).

I. General Diseases.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
1. Enteric Fever.	1a. Typhoid Fever.		1	1	1	..	64	15	3	..	11	1	2	..	M F	82 17	99
	1b. Paratyphoid Fever.		..	..	..	..	..	2	..	1	..	..	..	..	M F	0 3	3
2. Typhus Fever.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
3. Relapsing Fever.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
4. Mediterranean Fever.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
5. Malaria.			1	..	2	2	1002	234	21	18	101	16	5	1	M F	1,132 271	1,403
6. Small-pox.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
7. Measles.			..	..	..	..	2	3	1	..	..	..	..	..	M F	3 3	6
8. Scarlet Fever.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
9. Whooping Cough.			..	..	..	..	1	1	..	2	..	1	..	..	M F	1 4	5
10. Diphtheria.			..	1	..	..	5	10	..	1	..	..	..	..	M F	5 12	17
		Carried forward	2	2	3	2	1074	265	25	22	112	18	7	1			

MORTALITY BY NATIONALITIES FOR THE -YEAR 1930.

I. General Diseases—*(Contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	2	2	3	2	1074	265	25	22	112	18	7	1			
11. Influenza.	11a. With pulmonary complications.	(1) With pneumonic complications.	..	..	..	1	10	8	20	13	7	4	..	..	M F	37 26	63
		(2) With other pulmonary complications.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	11b. Without pulmonary complications.	(1) With non-pulmonary complications.	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
		(2) Without stated complications.	..	..	1	1	41	27	20	20	10	6	..	..	M F	72 54	126
12. Milliary Fever.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
13. Mumps.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
14. Asiatic Cholera.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
15. Cholera Nostras.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
16. Dysentery.	16a. Amoebic.		..	..	..	..	68	3	1	1	15	1	1	..	M F	85 5	90
	16b. Bacillary.		..	..	..	..	84	2	..	..	10	..	..	..	M F	94 2	96
	16c. Other or Unspecified.		..	..	..	1	225	96	6	9	3	5	..	..	M F	234 111	345
		Carried forward	2	2	4	5	1503	401	72	65	157	34	8	1			

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I. General Diseases—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	2	2	4	5	1503	401	72	65	157	34	8	1			
17. Plague.	17a. Bubonic.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	17b. Pneumonic.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	17c. Septicaemic.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	17d. Not otherwise defined.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
18. Yellow Fever.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
19. Spirochaetosis ictero-haemorrhagica.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
20. Leprosy.			..	..	..	..	10	1	..	1	1	..	..	..	M F	11 2	13
21. Erysipelas.			..	1	..	..	2	1	..	..	..	..	..	..	M F	2 2	4
22. Acute Poliomyelitis.	(1) Acute poliomyelitis		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Acute polioencephalitis.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
23. Encephalitis lethargica.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
24. Meningococcal meningitis.			..	..	..	..	8	2	..	..	10	..	..	..	M F	18 2	20
		Carried forward	2	3	4	5	1523	405	72	66	168	34	8	1			

I. General Diseases—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	2	3	4	5	1523	405	72	66	168	34	8	1			
25. Other epidemic and endemic diseases.	(1) German Measles.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Varicella.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(3) Other diseases included under 25.		..	..	..	..	..	..	..	..	..	..	1	..	M F	1 0	1
26. Glanders.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
27. Anthrax.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
28. Rabies.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
29. Tetanus.			1	..	..	..	39	21	1	..	3	1	..	..	M F	44 22	66
30. Mycoses.	(1) Actinomycosis.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other mycoses.		..	..	..	..	1	..	1	..	..	..	..	..	M F	2 0	2
31. Tuberculosis of the respiratory system.			4	1	6	2	965	257	80	56	110	13	8	1	M F	1,173 330	1,503
32. Tuberculosis of the central nervous system.			..	1	2	..	20	8	..	..	4	..	..	..	M F	26 9	35
33. Tuberculosis of intestines and peritoneum.			..	..	..	..	5	3	..	1	1	..	..	..	M F	6 4	10
		Carried forward	7	5	12	7	2553	694	154	123	286	48	17	2			

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I. General Diseases—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	7	5	12	7	2553	694	154	123	286	48	17	2			
34. Tuberculosis of vertebral column.			..	..	..	..	5	1	..	..	..	..	..	..	M F	5 1	6
35. Tuberculosis of joints.			..	..	..	..	7	..	..	..	..	..	..	..	M F	7 0	7
36. Tuberculosis of other organs.	a. Skin and subcutaneous tissues.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Bones.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	c. Lymphatic system.		..	..	..	..	1	1	..	..	..	1	..	..	M F	1 2	3
	d. Genito-Urinary system.		..	..	1	..	..	..	..	..	..	..	..	..	M F	1 0	1
	e. Other sites included under 36.		..	..	..	..	..	..	..	..	..	..	..	..	F F	0 0	0
37. Disseminated tuberculosis.	a. Acute.		..	..	..	..	5	1	..	..	1	..	..	..	M F	6 1	7
	b. Chronic or unstated.		..	..	..	..	22	8	9	5	1	3	1	..	M F	33 16	49
38. Syphilis.			..	..	..	..	93	36	2	1	4	..	..	2	M F	99 39	138
39. Soft chancre.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
40. Gonococcal Infection.	(1) Gonococcal infection except ophthalmia.		..	..	..	..	..	..	..	..	1	..	..	..	M F	1 0	1
		Carried forward	7	5	13	7	2687	741	165	129	293	52	18	4			

I. **General Diseases**—*(Contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	7	5	13	7	2687	741	165	129	293	52	18	4			
	(2) Gonorrhoeal or purulent ophthalmia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
41. Purulent infection, Septicaemia.			1	..	2	..	84	16	4	1	8	3	..	..	M F	99 20	119
42. Other infectious diseases.	(1) Vaccinia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other diseases included under 42.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
II. **General Diseases not included above.**																	
43. Cancer of the buccal cavity.			..	..	..	..	2	1	..	..	2	..	..	..	M F	4 1	5
44. Cancer of the pharynx, etc.			..	..	3	..	68	14	2	2	3	1	1	2	M F	77 19	96
45. Cancer of the peritoneum, intestines and rectum.			..	..	..	1	9	3	1	..	1	..	..	..	M F	11 4	15
46. Cancer of the female genital organs.			..	1	..	..	..	14	..	2	..	2	..	..	M F	0 19	19
47. Cancer of the breast.			..	..	..	1	..	11	..	1	..	..	..	..	M F	0 13	13
48. Cancer of the skin.			..	..	..	..	3	2	..	..	..	..	..	..	M F	3 2	5
		Carried forward	8	6	18	9	2853	802	172	135	307	58	19	6			

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II. General Diseases not included above—*(contd.)*			Europeans M	Europeans F	Eurasians M	Eurasians F	Chinese M	Chinese F	Malays M	Malays F	Indians M	Indians F	Others M	Others F	Sex	Totals	
		Brought forward	8	6	18	9	2853	802	172	135	307	58	19	6			
49. Cancer of other or unspecified organs.			..	..	..	2	25	8	1	..	2	..	..	..	M F	28 10	38
50. Tumours not returned as malignant.			..	..	..	..	..	1	..	..	..	1	..	..	M F	0 2	2
51. Rheumatic Fever.			..	..	..	..	1	..	1	..	..	..	..	..	M F	2 0	2
52. Chronic rheumatism, Osteo-arthritis, Gout.	(1) Chronic rheumatism chronic arthritis.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(2) Rheumatoid arthritis.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(3) Gout.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
53. Scurvy.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
54. Pellagra.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
55. Beri-beri.			..	..	..	..	581	168	36	21	6	4	1	1	M F	624 194	818
56. Rickets			..	..	..	..	1	2	..	..	..	..	..	..	M F	1 2	3
57. Diabetes.			2	..	..	..	15	11	1	1	3	5	..	..	M F	21 17	38
58. Anaemia, Chlorosis.	a. Pernicious anaemia.		..	..	..	..	1	..	..	..	..	1	..	..	M F	1 1	2
		Carried forward	10	6	18	11	3478	994	211	157	318	69	20	7			

II. General Diseases not included above—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	10	6	18	11	3478	994	211	157	318	69	20	7			
	b. Other anaemia and chlorosis.		..	..	..	..	5	3	1	1	6	4	..	..	M F	12 8	20
59. Diseases of the pituitary gland.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
60. Diseases of the thyroid gland.	a. Exophthalmic goitre.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	b. Other diseases of the thyroid gland.	(1) Myxoedema.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(2) Cretinism.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(3) Other diseases included under 60b.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
61. Diseases of the parathyroid glands.	(1) Tetany.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(2) Other diseases of the parathyroid glands.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
62. Diseases of the thymus.			..	..	..	..	..	..	..	..	1	..	..	..	M F	1 0	1
63. Diseases of the adrenals.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
64. Diseases of the spleen.			..	..	..	..	5	..	..	..	..	..	..	..	M F	5 0	5
65. Leukaemia, Lyphadenoma.	a. Leukaemia		..	..	..	..	2	..	1	..	3	..	..	..	M F	6 0	6
		Carried forward	10	6	18	11	3490	999	213	158	328	73	20	7			

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II. General Diseases not included above—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	10	6	18	11	3490	999	213	158	328	73	20	7			
	b. Lymphadenoma.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
66. Alcoholism.			..	..	..	..	1	..	..	..	..	..	..	..	M F.	1 0	1
67. Chronic poisoning by mineral substances.	(1) Occupational lead poisoning.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other chronic poisoning by mineral substances.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
68. Chronic poisoning by organic substances.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
69. Other general diseases.	(1) Purpura.		..	..	..	..	..	3	..	..	1	..	..	..	M F	1 3	4
	(2) Haemophilia.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(3) Other diseases included under 69.		..	..	1	..	4	5	..	..	2	1	..	..	M F	7 6	13
III. Diseases of the Nervous System and Sense Organs.																	
70. Encephalitis.	(1) Cerebral abscess.		..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
	(2) Other diseases included under 70.		..	..	..	..	..	..	..	..	..	1	..	..	M F	0 1	1
71. Meningitis.			..	..	..	..	20	9	..	..	2	1	1	1	M F	23 11	34
		Carried forward	10	6	19	11	3517	1017	213	158	333	76	21	8			

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III. Diseases of the Nervous System and Sense Organs—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	10	6	19	11	3517	1017	213	158	333	76	21	8			
72. Tabes dorsalis.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
73. Other diseases of the spinal cord.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
74. Cerebral haemorrhage, Apoplexy, etc.	a. Cerebral haemorrhage.	(1) Cerebral haemorrhage so returned.	..	..	1	1	49	29	2	..	4	2	..	1	M F	56 33	89
		(2) Apoplexy (lesion unstated).	1	..	..	..	12	10	..	..	..	..	1	1	M F	14 11	25
	b. Cerebral thrombosis and embolism.	(1) Cerebral embolism.	..	..	..	..	1	1	1	..	..	..	..	..	M F	2 1	3
		(2) Cerebral thrombosis.	..	..	..	..	..	1	..	..	1	..	..	1	M F	1 2	3
75. Paralysis of unstated origin.	a. Hemiplegia.		..	..	..	..	4	5	2	..	1	2	1	..	M F	8 7	15
	b. Other forms of paralysis.		..	..	..	..	9	5	..	..	..	..	..	..	M F	9 5	14
76. General paralysis of the insane.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
77. Other forms of insanity.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
78. Epilepsy.			..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
		Carried forward	11	6	20	12	3594	1069	218	158	339	80	23	11			

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III. Diseases of the Nervous System and Sense Organs—(*contd.*)			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	11	6	20	12	3594	1069	218	158	339	80	23	11			
79. Convulsions (non peurperal 5 years and over).			..	..	..	..	3	4	1	..	..	1	..	..	M F	4 5	9
80. Infantile convulsions (under 5 years of age).			1	..	4	2	559	432	135	149	20	18	..	..	M F	719 601	1,320
81. Chorea.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
82. Hysteria and neuritis.	(1) Hysteria, Neuralgia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Neuritis.		..	..	..	1	2	7	..	9	1	2	..	1	M F	3 20	23
83. Cerebral softening.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
84. Other diseases of the nervous system.	(1) Idiocy, Imbecility.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(2) Cerebral tumour.		..	..	..	..	1	2	..	..	..	..	..	..	M F	1 2	3
	(3) Disseminated sclerosis.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	(4) Paralysis agitans.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	(5) Other diseases included under 84.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	12	6	24	15	4161	1515	354	316	360	101	23	12			

III. Diseases of the Nervous System and Sense Organs—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	12	6	24	15	4161	1515	354	316	360	101	23	12			
85. Diseases of the eye and annexa.			..	..	..	..	..	..	..	..	2	..	..	..	M F	2 0	2
86. Diseases of the ear and mastoid sinus.	(1) Diseases of the mastoid sinus.		..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
	(2) Diseases of the ear.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
IV. Diseases of the Circulatory System.																	
87. Pericarditis.			..	1	..	..	5	..	1	..	..	..	..	..	M F	6 1	7
88. Acute endocarditis and myocarditis.	(1) Malignant endocarditis.		1	..	..	..	5	1	1	..	..	..	..	..	M F	7 1	8
	(2) Other acute endocarditis.		1	..	..	..	8	4	1	1	..	..	..	..	M F	10 5	15
	(3) Acute myocarditis.		1	..	..	1	21	4	..	..	5	..	..	..	M F	27 5	32
89. Angina pectoris.			..	..	..	..	1	..	..	..	..	1	..	..	M F	1 1	2
90. Other diseases of the heart.	(1) Aortic valve disease.		..	..	..	..	14	5	1	..	3	..	..	..	M F	18 5	23
	(2) Mitral valve disease.		..	..	..	..	..	2	..	..	..	..	..	..	M F	0 2	2
	(3) Aortic and mitral valve disease.		..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
		Carried forward	15	7	24	16	4220	1531	358	317	370	102	23	12			

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IV. Diseases of the Circulatory System—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	15	7	24	16	4220	1531	358	317	370	102	23	12			
	(4) Other or unspecified valve disease.		..	..	..	..	34	28	1	2	3	1	..	..	M F	38 31	69
	(5) Fatty heart.		..	..	..	..	..	2	..	..	..	..	..	..	M F	0 2	2
	(6) Dilatation of heart (cause unspecified)		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	(7) Other or unspecified myocardial diseasc		4	1	..	..	34	5	..	..	5	1	..	..	M F	43 7	50
	(8) Disordered action of heart.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(9) Heart disease (undefined)		..	..	..	1	8	7	2	..	..	..	..	..	M F	10 8	18
91. Diseases of the arteries.	a. Aneurysm.		..	..	..	..	13	2	..	..	2	..	..	..	M F	15 2	17
	b. Arterio-sclerosis.	(1) Arterio sclerosis with record of cerebral vascular lesion.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(2) Arterio sclerosis without record of cerebral vascular lesion.	..	..	..	2	20	5	..	..	2	..	2	..	M F	24 7	31
	c. Other diseases of the arteries.		1	..	..	..	7	..	..	..	..	..	..	..	M F	8 0	8

IV. Diseases of the Circulatory System—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	20	8	24	19	4337	1581	361	319	382	104	25	12			
92. Embolism and thrombosis (not cerbral).			..	..	1	..	..	9	..	3	..	1	..	..	M F	1 13	14
93. Diseases of the veins (Varix, haemorrhoids, phlebitis, etc.)			..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
94. Diseases of the lymphatic system.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
95. Haemorrhage without stated cause.			..	..	..	..	4	..	..	..	..	..	..	..	M F	4 0	4
96. Other diseases of the circulatory system.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
V. Diseases of the Respiratory System.																	
97. Diseases of the nasal fossae and annexa.	(1) Diseases of the nose		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Diseases of the accessory nasal sinuses.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
98. Diseases of the Larynx.	(1) Laryngismus stridulus.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Laryngitis.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(3) Other diseases of the larynx.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	20	8	25	19	4343	1591	361	322	382	105	25	12			

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V. Diseases of the Respiratory System—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	20	8	25	19	4343	1591	361	322	382	105	25	12			
99. Bronchitis.	a. Acute bronchitis.		..	..	..	..	15	11	4	5	2	..	..	..	M F	21 16	37
	b. Chronic bronchitis.		..	..	..	..	5	4	..	..	4	..	..	..	M F	9 4	13
	c. & d. Bronchitis not distinguished as acute or chronic.		..	..	..	..	133	117	34	30	4	9	..	..	M F	171 156	327
100. Broncho-pneumonia.			1	1	1	8	439	297	42	29	23	22	1	1	M F	507 358	865
101. Pneumonia, lobar, or not otherwise defined.	a. Lobar pneumonia.		..	..	1	4	205	35	21	6	82	10	1	1	M F	310 56	366
	b. Pneumonia not otherwise defined.		..	..	..	1	261	104	44	26	31	13	2	1	M F	338 145	483
102. Pleurisy.	1. Empyema.		..	..	..	..	7	2	2	..	1	..	..	..	M F	10 2	12
	2. Other pleurisy.		..	..	..	..	6	2	..	..	1	..	..	..	M F	7 2	9
103. Congestion and haemorrhage infarct of lung.			..	..	..	1	4	..	..	..	1	..	..	..	M F	5 1	6
104. Gangrene of the lung.			..	..	..	..	1	2	..	..	1	..	..	..	M F	2 2	4
105. Asthma.			..	..	..	..	7	5	..	1	1	1	1	1	M F	9 8	17
106. Pulmonary emphysema.			..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
		Carried forward	21	9	27	33	5428	2170	508	419	533	160	30	16			

V. Diseases of the Respiratory System—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	21	9	27	33	5428	2170	508	419	533	160	30	16			
107. Other diseases of the respiratory system.	a. Chronic interstitial pneumonia including occupational diseases of the lung		..	..	..	..	4	1	..	..	..	..	..	..	M F	4 1	5
	b. Diseases of the mediastinum.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	c. Other diseases included under 107		..	..	..	..	3	1	1	..	1	1	..	..	M F	5 2	7
VI. Diseases of the Digestive System.																	
108. Diseases of the buccal cavity and annexa.	(1) Diseases of the teeth and gums.		..	..	..	..	2	..	1	..	..	..	..	..	M F	3 0	3
	(2) Ludwigs angina.		..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
	(3) Other diseases included under 108.		..	..	..	..	3	..	..	..	..	..	..	..	M F	3 0	3
109. Diseases of the pharynx and tonsils.	(1) Tonsillitis, Adenoid Vegetations.		..	..	..	..	..	2	..	..	..	..	..	..	M F	0 2	2
	(2) Other diseases included under 109.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
110. Diseases of the oesophagus.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
111. Ulcer of the stomach or duodenum.	a. Ulcer of the stomach.		..	..	..	..	12	5	..	..	1	1	2	..	M F	15 6	21
		Carried forward	21	9	27	33	5455	2179	510	419	535	162	32	16			

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VI. Diseases of the Digestive System—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	21	9	27	33	5455	2179	510	419	535	162	32	16			
	b. Ulcer of the duodenum.		..	..	..	..	2	..	1	..	..	..	..	..	M F	3 0	3
112. Other diseases of the stomach.	1. Inflammation of the stomach.		..	..	..	..	54	35	37	24	6	4	..	..	M F	97 63	160
	2. Other diseases included under 112.		1	..	..	..	5	2	..	..	..	..	..	1	M F	6 3	9
113. & 114. Diarrhoea and enteritis.	(1) Ulceration of the intestines.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Colitis.		..	..	..	1	33	21	2	1	2	..	..	..	M F	37 23	60
	(3) Other diseases included under 113 and 114.		..	2	4	3	425	378	27	29	25	11	1	1	M F	482 424	906
115. Ankylostomiasis.			..	..	..	..	3	2	..	..	4	2	..	..	M F	7 4	11
116. Diseases due to other intestinal parasites.	a. Cestodes, (hydatids of liver excepted).		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Trematodes.		..	..	..	..	..	..	..	..		..	..	..	M F	0 0	0
	c. Nematodes other than Ankylostoma.		..	..	..	..	7	1	..	..	1	..	..	..	M F	8 1	9
	d. Coccidia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	e. Other specified parasites in 116.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	22	11	31	37	5984	2618	577	473	573	179	33	18			

VI. Diseases of the Digestive System—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	22	11	31	37	5984	2618	577	473	573	179	33	18			
	f. Undefined intestinal parasites.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
117. Appendicitis.			2	..	..	..	8	6	1	..	2	..	..	..	M F	13 6	19
118. Hernia, Intestinal obstruction.	a. Hernia.		..	..	..	..	5	..	..	..	2	..	..	..	M F	7 0	7
	b. Intestinal obstruction.		1	..	..	..	2	3	..	..	2	..	..	..	M F	5 3	8
119. Other diseases of the intestines.	1. Intestinal stasis.		..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
	2. Other diseases included under 119.		..	..	..	..	3	..	..	..	..	..	..	..	M F	3 0	3
120. Acute yellow atrophy of the liver.			..	..	..	..	1	..	..	..	..	..	1	..	M F	2 0	2
121. Hydatid tumour of the liver.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
122. Cirrhosis of the liver.	(a) Returned as alcoholic.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(b) Not returned as alcoholic		1	1	..	..	64	9	5	..	4	..	..	..	M F	74 10	84
123. Biliary Calculi.			..	..	..	..	3	..	..	..	1	..	1	..	M F	5 0	5
124. Other diseases of the liver.			..	..	2	..	21	7	..	1	7	..	1	..	M F	31 8	39
		Carried forward	26	12	33	37	6093	2643	583	474	591	179	36	18			

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VI. Diseases of the Digestive System—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	26	12	33	37	6093	2643	583	474	591	179	36	18			
125. Diseases of the pancreas.			..	..	..	..	1	..	..	..	1	..	..	..	M F	2 0	2
126. Peritonitis without stated cause.			..	..	1	..	24	3	..	..	3	..	..	..	M F	28 3	31
127. Other diseases of the digestive system.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
VII. Non-Venereal Diseases of the Genito-Urinary System and Annexa.																	
128. Acute nephritis. (including unspecified under 10 years of age).			..	..	..	..	53	45	3	6	8	1	..	..	M F	64 52	116
129. Chronic nephritis. (including unspecified over 10 years of age).			1	1	4	1	277	161	23	19	14	8	3	1	M F	322 191	513
130. Chyluria.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
131. Other diseases of the kidney and annexa.			1	..	1	..	12	3	..	..	2	1	1	..	M F	17 4	21
132. Calculi of the urinary passages.			..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
133. Diseases of the bladder.	1. Cystitis.		..	..	..	1	9	2	1	..	1	..	..	..	M F	11 3	14
		Carried forward	28	13	39	39	6471	2857	610	499	620	189	40	19			

VII. Non-Venereal Diseases of the Genito-Urinary System and Annexa—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	28	13	39	39	6471	2857	610	499	620	189	40	19			
	2. Other diseases of the bladder.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
134. Diseases of the urethra, urinary abscess, etc.	a. Stricture of the urethra, etc.,		..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
	b. Other diseases of the urethra.		..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
135. Diseases of the prostate.			1	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
136. Non-venereal diseases of the male genital organs.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
137. Cysts, and other tumours of the ovary not returned as malignant.			..	..	..	..	..	2	..	..	..	2	..	..	M F	0 4	4
138. Salpingitis and pelvic abscess in females.	1. Salpingitis.		..	..	..	..	..	3	..	..	..	2	..	..	M F	0 5	5
	2. Pelvic abscess in females.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
139. Tumours of the uterus not returned as malignant.			..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
140. Non-puerperal uterine-haemorrhage.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0	0
		Carried forward	29	13	39	39	6475	2865	610	499	620	193	40	19			

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VII. Non-Venereal Diseases of the Genito-Urinary System and Annexa—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	29	13	39	39	6475	2865	610	499	620	193	40	19			
141. Other diseases of the female genital organs.	1. Other diseases of the uterus.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	2. Diseases of the female genital organs not included under other headings.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
142. Non-puerperal diseases of the breast			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
VIII. The Puerperal State.																	
143. Accidents of pregnancy.	a. Abortion.		..	..	..	..	..	2	..	..	..	1	..	..	M F	0 3	3
	b. Ectopic gestation.		..	..	..	..	..	2	..	..	..	..	..	..	M F	0 2	2
	c. Other accidents of pregnancy.		..	..	..	..	..	9	..	1	..	..	..	..	M F	0 10	10
144. Puerperal Haemorrhage.			..	..	..	..	..	10	..	4	..	3	..	..	M F	0 17	17
145. Other accidents of childbirth.			..	..	..	..	..	5	..	2	..	2	..	..	M F	0 9	9
146. Puerperal sepsis.			..	..	..	..	..	8	..	1	..	3	..	..	M F	0 12	12
147. Puerperal phlegmasia alba dolens, embolism and sudden death.	1. Puerperal phlegmasia alba dolens not returned as septic.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	29	13	39	39	6475	2901	610	507	620	202	40	19			

VIII. The Puerperal State.—(*contd.*)			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	29	13	39	39	6475	2901	610	507	620	202	40	19			
	2. Puerperal embolism and sudden death.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
148. Puerperal albuminuria and convulsions.			..	1	..	..	..	16	..	4	..	3	..	..	M F	0 24	24
149. Childbirth not assignable to other headings (puerperal insanity).			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
150. Puerperal diseases of the breast.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
IX. Diseases of the Skin and Cellular Tissue.																	
151. Gangrene	1. Senile gangrene. (aged 60 and over).		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	2. Other gangrene.		..	..	..	1	12	7	1	1	2	..	..	..	M F	15 9	24
152. Carbuncle, boil.			..	..	..	..	4	3	1	1	..	..	..	..	M F	5 4	9
153. Cellulitis, acute abscess.	1. Cellulitis.		..	..	..	..	8	3	..	..	2	..	..	..	M F	10 3	13
	2. Acute abscess.		..	..	..	..	3	1	..	..	1	..	..	..	M F	4 1	5
154. Other diseases of the skin and its annexa.	1. Ulcer, bedsore.		..	..	..	..	1	2	..	..	..	..	..	..	M F	1 2	3
		Carried forward	29	14	39	40	6504	2933	612	513	625	205	40	19			

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IX. Diseases of the Skin and Cellular Tissue—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	29	14	39	40	6504	2933	612	513	626	205	40	19			
	2. Eczema.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	3. Pemphigus.		..	..	..	..	..	2	..	..	1	..	..	..	M F	1 2	3
	4. Other diseases included under 154.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
X. Diseases of the Bones and Organs of Locomotion.																	
155. Diseases of the Bones.	1. Acute infective osteomyelitis and periostitis.		..	..	..	..	1	1	..	..	..	..	..	..	M F	1 1	2
	2. Other diseases of the bones.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
156. Diseases of the joints.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
157. Amputation.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
158. Other diseases of the organs of locomotion.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
XI. Congenital Malformations.																	
159. Congenital malformations.	1. Congenital hydrocephalus.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
		Carried forward	29	14	39	40	6508	2936	612	513	625	205	40	19			

XI. Congenital Malformations—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	29	14	39	40	6508	2936	612	513	626	205	40	19			
	2. Congenital malformation of heart.		..	..	..	..	3	1	..	..	..	..	..	..	M F	3 1	4
	3. Other congenital malformations.		..	..	..	1	3	5	..	1	..	1	..	..	M F	3 8	11
XII. Diseases of Early Infancy.																	
160. Congenital debility sclerema and icterus.	1. Congenital debility and sclerema.		..	..	..	5	88	123	22	21	12	14	..	1	M F	122 164	286
	2. Icterus neonatorum.		..	..	..	..	12	9	1	..	..	1	..	..	M F	13 10	23
161. Premature birth, injury at birth.	1. Premature birth.		..	..	2	2	217	238	21	19	15	17	..	1	M F	255 277	532
	2. Injury at birth.		..	..	..	..	6	5	..	..	3	3	1	..	M F	10 8	18
162. Other diseases peculiar to early infancy.	1. Diseases of the umbilicus.		..	..	..	..	..	2	1	2	..	..	..	..	M F	1 4	5
	2. Atelectasis.		..	..	1	1	20	10	..	..	2	2	..	..	M F	23 13	36
	3. Other diseases included under 162.		1	..	..	..	2	..	..	..	..	1	..	1	M F	3 2	5
163. Lack of care.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	30	14	42	49	6859	3329	657	556	658	244	41	22			

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XIII. Old Age.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	30	14	42	49	6859	3329	657	556	658	244	41	22			
164. Old age.	1. Senile dementia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	2. Other forms of senile decay.		1	1	5	6	190	152	49	50	8	14	3	3	M F	256 226	482
XIV. External Causes.																	
165. & 166. Suicide by solid or liquid poisons and corrosive substances.			..	..	1	..	..	3	..	..	..	..	..	..	M F	1 3	4
167. Suicide by poisonous gas.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
168. Suicide by hanging or strangulation.			..	..	..	..	43	8	..	..	2	..	..	1	M F	45 9	54
169. Suicide by drowning.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
170. Suicide by firearms.			..	..	1	..	1	..	1	..	..	..	..	..	M F	3 0	3
171. Suicide by cutting or piercing instruments.			..	..	..	..	5	..	..	..	1	..	..	..	M F	6 0	6
172. Suicide by jumping from high place.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
173. Suicide by crushing.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	31	15	49	55	7099	3492	707	606	669	258	44	26			

XIV. External Causes—*(contd.)*		Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
		M	F	M	F	M	F	M	F	M	F	M	F			
	Brought forward	31	15	49	55	7099	3492	707	606	669	258	44	26			
174. Suicide by other means.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
175. Food poisoning.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
176. Poisoning by venomous animals.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
177. Other acute accidental poisoning (not by gas).		..	..	..	..	4	4	..	..	..	..	..	..	M F	4 4	8
178. Conflagration.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
179. Accidental burns (conflagration excepted).		..	..	..	..	7	7	..	..	2	..	..	..	M F	9 7	16
180. Accidental mechanical suffocation.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
181. Accidental absorption of irrespirable or poisonous gas.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
182. Accidental drowning.		..	..	..	..	18	5	2	..	3	..	..	..	M F	23 5	28
183. Accidental injury by firearms.		..	..	..	..	..	..	..	..	1	..	..	..	M F	1 0	1
184. Accidental injury by cutting or piercing instruments.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	Carried forward	31	15	49	55	7128	3509	709	606	675	258	44	26			

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XIV. External Causes—*(contd.)*		Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
		M	F	M	F	M	F	M	F	M	F	M	F			
	Brought forward	31	15	49	55	7128	3509	709	606	675	258	44	26			
185. Accidental injury by fall.		..	..	..	..	13	2	1	1	..	..	..	..	M F	14 3	17
186. Accidental injury in mining & quarrying.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
187. Accidental injury by machinery.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
188. Accidental injury by other forms of crushing (road vehicles on railways, &c.)		1	..	..	..	15	6	1	..	4	..	1	..	M F	22 6	28
189. Injury by animals (poisoning by venomous animals excepted).		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
190. Wounds of war.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
191. Execution of civilians by belligerent armies.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
192. Hunger or thirst.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
193. Excessive cold.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
194. Excessive heat.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	Carried forward	32	15	49	55	7156	3517	711	607	679	258	45	26			

XIV. External Causes—(*contd.*)	Europeans M	Europeans F	Eurasians M	Eurasians F	Chinese M	Chinese F	Malays M	Malays F	Indians M	Indians F	Others M	Others F	Sex	Totals	
Brought forward	32	15	49	55	7156	3517	711	607	679	258	45	26			
195. Lightning.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
196. Electricity (Lightning excepted).	..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
197. Homicide by firearms.	..	..	..	..	6	..	1	..	..	..	..	..	M F	7 0	7
198. Homicide by cutting or piercing instruments	..	..	..	..	13	4	1	..	3	3	..	..	M F	17 7	24
199. Homicide by other means.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
200. Infanticide (under one year).	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
201. Fracture (cause not specified).	..	..	..	..	6	2	..	..	..	..	..	..	M F	6 2	8
202. Other and unstated forms of accidental violence, Execution.	..	..	..	..	8	..	..	..	1	..	..	..	M F	9 0	9
203. Violent deaths of unstated nature (i.e. accidental, suicidal &c.) and cause.	3	..	..	..	67	7	2	1	8	1	1	..	M F	81 9	90
XV. Ill Defined Diseases.															
204. Sudden death.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
Carried forward	35	15	49	55	7258	3530	715	608	691	262	46	26			

MORTALITY BY NATIONALITIES FOR THE YEAR 1930.

XV. Ill Defined Diseases—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	35	15	49	55	7258	3530	715	608	691	262	46	26			
205. Cause of death unstated or ill-defined.	1. Heart failure (age 1—70).		..	1	..	1	9	2	1	1	3	1	..	1	M F	13 7	20
	2. Other ill-defined causes.		..	1	3	1	218	131	15	17	8	4	..	1	M F	244 155	399
	3. Cause not specified.		..	..	..	..	22	8	1	..	3	..	3	2	M F	29 10	39
			35	17	52	57	7507	3671	732	626	705	267	49	30	M F	9,080 4,668	13,748
			52		109		11,178		1,358		972		79				

MORTALITY ACCORDING TO NATIONALITIES AND AGES.

The following return shows the number of deaths at different age periods in the different nationalities:—

	Sex	Under 3 months	3—12 months	1—5 years	5—10 years	10—20 years	20—25 years	25—35 years	35—45 years	45—55 years	Over 55 years	Unknown	TOTAL	
Europeans ..	M	2	—	—	1	—	4	4	10	9	5	—	35	52
	F	1	3	—	—	—	—	6	1	2	4	—	17	
Eurasians ..	M	8	3	6	2	1	—	5	5	10	12	—	52	109
	F	10	12	5	—	—	2	6	3	7	12	—	57	
Chinese ..	M	883	784	552	131	269	484	1,219	1,238	1,134	805	8	7,507	11,178
	F	752	677	500	108	144	145	337	328	279	399	2	3,671	
Malays ..	M	145	135	74	20	16	30	92	67	50	103	—	732	1,358
	F	133	131	58	15	21	27	65	46	44	86	—	626	
Indians ..	M	58	40	34	8	20	74	203	129	91	48	—	705	972
	F	50	40	32	9	17	14	44	19	18	23	1	267	
Others ..	M	4	2	3	—	2	4	3	9	8	12	2	49	79
	F	3	1	3	—	2	1	1	7	2	8	2	30	
Total ..	M	1.100	964	669	162	308	596	1,526	1,458	1,302	985	10	9,080	13,748
	F	949	864	598	132	184	189	459	404	352	532	5	4,668	
Grand Total	..	2.049	1.828	1,267	294	492	785	1,985	1,862	1,654	1,517	15		

GENERAL DEATH RATE.

The crude death rate was 27.73 per 1,000 as compared with 26.21 in 1929 and 28.44 in 1928. Had the 1929 rate been maintained the number of deaths would have been approximately 12.995 whereas they numbered 13,748 i.e. there is an actual increase of 753 on the 1929 figures to be accounted for. It is possible by examination of the death registers to find out fairly closely what diseases are responsible for the increase but any speculations as to the cause of that increased mortality must be largely conjectual.

The infantile death rate in 1929 was 197.2 per 1,000 births. During the year under review it rose to 219. Had the 1929 rate continued the total number of infant deaths in 1930 would have been 3,490. But it was actually 3,877 i.e. an increase of 387, so that over half the increase in the crude death rate is to be found in the increased infantile death rate. This will be more fully discussed later.

In seeking to account for the other increased deaths the following table is of assistance. It shows the chief causes of death for 1929 and 1930. I also show what the number of deaths would have been in 1930 if the 1929 rates had been maintained. This total is arrived at by adding to the 1929 rate, one thirtieth of the total, which is the fraction by which the 1930 estimated mean annual population increased.

The figures of course are approximate.

	Total deaths from these causes			Excess	
	1929	1930	1930 (corrected)	+	—
Pneumonias	1,770	1,714	1,829		115
Tuberculosis	1,500	1,622	1,550	72	
Infantile Convulsions ..	1,248	1,320	1,290	30	
Malaria	1,080	1,403	1,116	287	
Diarrhoea and Enteritis ..	830	969	858	111	
Beri-beri	701	818	724	94	
Diseases of Early Infancy ..	675	905	698	207	
Causes unstated	637	458	658		200
Nephritis	552	629	570	59	
Dysenteries	448	531	463	68	
Bronchitis	263	377	272	105	
Influenza	87	190	90	100	
				1,133	315
		Total excess ..		818	

These, it will be seen, account for rather more than all the increased deaths. As already stated infant mortality accounts for half the increase. They are included in the table above under Infantile Convulsions, Diarrhoea and Enteritis, Diseases of Early Infancy and to a certain extent Bronchitis, and these causes of death, therefore, we need not consider further.

The Pneumonias show a credit of 115 on the 1929 deaths but there is a debit of 105 under the cause of death Bronchitis. The increase under Bronchitis may mean either more accurate or less accurate diagnosis, most probably the latter, as the increased deaths from this cause was largely in infants, who were more likely to have died of Broncho Pneumonia. It is safer therefore to take Pneumonia and Bronchitis together, and if this is done there is little difference from the 1929 figures. At the same time it should be remembered that there was an actual increase of 75 infant deaths from Bronchitis in 1930 and that these have already been allowed for in our search for the increased general mortality.

This leaves seven main causes of deaths only to be considered. Malaria is an easy first with an increase of 287. This disease was more prevalent throughout the whole country than it was in 1929 and was I imagine due to climatic conditions. At any rate my experience of Singapore is that the drier the year the more malarious it is. How many of the increased number of deaths should be allocated to Singapore town is a different matter and will be discussed when dealing with malaria.

The next largest increase is due to Influenza. This is rather a mystery and is difficult to account for as there was no sign of a real epidemic throughout the year. I imagine it includes many real mal-diagnoses which might well be placed elsewhere.

Beriberi and Nephritis account for 94 and 59 excess deaths respectively. These two might well be taken together as it is quite easy to mistake a Beriberi case for Nephritis. And it is very likely there was an increase in Beriberi during the year caused by the lowering of the dietary standard during the slump.

Tuberculosis accounted for 72 extra deaths which considering the total number and the conditions prevalent is not, under the circumstances, a large increase. Slump conditions and a lowered resistance could easily account for the increase.

The Dysenteries showed an increase of 68. These may be terminal dysenteries following on some other chronic condition or they may be deaths in real chronic Dysentery patients. In either case slump conditions and a lower standard of living would hasten a fatal termination.

The large decrease in the number of deaths from causes unstated is difficult to explain unless it is due to improved diagnosis and more care being taken by medical men and inspecting registrars to refer deaths to primary causes. It is significant at any rate that for 148 deaths of infants certified under this loose heading in 1929 only 66 are so certified this year.

Speaking generally with regard to the crude death rate Malaria was, as already mentioned, rather more prevalent all over in 1930 and resulted, as seen, in a substantial increase in the Singapore deaths from that cause. How many of these deaths were the result of Singapore infections and how many were "external" and should be referred to other places it is hard to say. In previous reports I have tried to show how Singapore, on account of its geographical position its size and its modern hospital facilities, pays the penalty of being made the clearing house for the sick and the decrepits of the Federated Malay States and surrounding islands. The result is that it is saddled with a death rate which is, I am confident, far in excess of what it ought to be. In previous reports, too, I have endeavoured to prove this by analysing the cases of Malaria notified as having been treated in the second and third class wards of the two large Government hospitals. From the information given in these notifications as to the addresses, previous residence, etc., of those patients it is possible to get a rough idea of where they came from and where they contracted Malaria. Applying the percentage figure so obtained to the recorded Malaria deaths, at least a reasonable guess may be made at the number which may be labelled " external." I give the analysis of the figures again this year for what it is worth.

6,554 admissions for Malaria were reported, 1,579 from the General Hospital and 4,975 from Tan Tock Seng.

These were classified as follows:—

Probable Singapore Infections ..	414
Possible Singapore Infections ..	279
Impossible Singapore Infections ..	2,265
Outside Municipal Limits ..	2,890
Insufficient addresses ..	706
	6,554

The classification into Probable, Possible and Impossible is based on our knowledge, which I may say is fairly exact, of where "carrier" Anophelines are to be found breeding in the Municipal Area.

The "Impossible" and "outside limits" figures together total 78.6%. The corresponding figure last year was 79%.

If we reckon all the others as being Singapore infections and apply the percentage figure so obtained, namely 21.4, to the recorded Malaria deaths, which were 1,403, we find that only 300 deaths should be credited (or is it debited) to Singapore.

Much the same could be said of other diseases especially those of a chronic nature where the sufferers drift into town being unfit for the more strenous work on estates and mines, but I do not propose to elaborate this further as, at the moment, it is almost impossible to obtain any information which is reliable.

Of the other chief causes of death the Pneumonias with 1,714 and Tuberculosis with 1,622 again head the list. Taken together they accounted for 24.3% of all deaths. Last year the figure was 26% and at first sight it would appear as if there had been a marked improvement. But it is as well to note the increase in Bronchitis deaths many of which were very likely Pneumonia. If the figures for the three diseases are taken together there is not much difference in the two years.

INFANTILE DEATH RATE.

The infantile mortality rate was 219 as against 197.2 in 1929. As already shown this represents an actual excess of 387 over the 1929 figures. The chief causes of deaths of infants for both years are shown below.

	1929	1930
Infantile Convulsions	1,073	1,080
Diseases of Early Infancy	672	902
Diarrhoea and Enteritis	607	720
Bronchitis and Pneumonias	587	666
Cause unstated	148	66
	3,087	3,434

The total births in 1929 were 17,551 and in 1930 they numbered 17,702 so that the figures for each disease should have been practically the same. But in three, Diseases of Early Infancy, Diarrhoea and Enteritis, and Bronchitis and Pneumonia it will be seen there is an actual increase of over 400.

In the Bronchitis and Pneumonia group the whole increase is due to Bronchitis. I have already pointed out the possible fallacy here. With regard to this increase and that from Diarrhoea and Enteritis it is not easy to assign a cause unless the abnormally dry weather experienced during the year contributed to it. But a study of the monthly figures reveals nothing very striking.

As a group, Diseases of Early Infancy from April to November inclusive showed a marked increase on the corresponding monthly figures for 1929. Other months were the same. Closer examination of the figures reveals a very significant fact. Of the 672 deaths in this group in 1929 Premature Birth was responsible for 357 but of the 904 in this group in 1930 the single cause was responsible for 532 deaths. That is of the total excess of 232 in this group 175 were due to Premature birth. The increase from this single cause was in the same months as above only it was much more marked averaging over 100% increase. I cannot account for the excessive mortality from this cause otherwise than by putting it down to the lowered standard of living occasioned by the slump. It was not until April that the full effect of the slump began to be felt and though it was still with us in December the fact that there was no increased mortality from the cause in that month may be explained by the assumption that repatriation of the workless and destitute, which commenced in August was taking effect.

But I find it hard to believe that Premature Birth is a correct diagnosis. The Supervising Staff of the Midwives and Infant Welfare branch did not report any marked increase in the number of prematurely born babies. There may of course have been a certain number of infants so handicapped but I am inclined to think that the factor operating most strongly was after birth viz a deficiency of both maternal and artificial feeding.

CERTIFICATION OF DEATHS.

The following return shows the number of deaths, the causes of which were certified by Medicalmen, Inspecting Registrars and the Coroner respectively:—

	Europeans	Eurasians	Chinese	Malays	Indians	Others	Total
Medicalmen ..	44	88	7,964	496	723	68	9,383
Registrars ..	—	14	2,841	848	204	4	3,911
Coroner ..	8	7	373	14	45	7	454
Total ..	52	109	11,178	1,358	972	79	13,748

This gives a percentage of 68.2 certified by Medicalmen as against 66.0 last year. 28.4 by Registrars as against 29.1 last year and 3.3 certified by the Coroner as against 4.8 last year.

The percentages for the last 10 years have been as follows:—

	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
Medicalmen	58.3	58.2	55.4	58.5	58.7	59.6	63.6	65.1	66.0	68.2
Registrars	36.1	35.1	37.3	35.0	33.9	34.1	30.1	28.9	29.1	28.4
Coroner	5.4	6.5	7.1	6.3	7.2	6.2	6.2	5.9	4.8	3.3

V. REGISTRATION OF BIRTHS AND DEATHS.

The numbers registered at the different offices were as follows:—

	Births	Deaths
Central Office	1,467	3,928
Prinsep Street Office	9,294	5,548
Kreta Ayer Office	5,715	3,631
Joo Chiat Office	1,226	641
	17,702	13,748

Fifty births and two deaths were registered in the Post Registration Books and the sum of $327 was received in late registration fees.

VI. & VII. ANALYTICAL & BACTERIOLOGICAL LABORATORIES.

The reports of the officers in charge of these laboratories are appended. I shall not attempt to synopsise them as they should be read in full by those interested. Despite the enormous amount of routine work conducted by these officers both have found time to carry out independent investigations into local problems, and the results obtained, while always of general scientific value, have been, in many instances, of particular value to other municipal departments. Both officers are to be congratulated.

Dr. Gilmour, Bacteriologist, went on home leave in December, but before he left he wrote his report on the work of the laboratory to the end of November. I have completed the summary to the end of the year and his report, therefore, is published in two parts.

His investigations into and his remarks on the subject of tuberculosis of cattle and swine are of especial interest to Malaya. Until a year or two ago it was fondly believed that tuberculosis of cattle did not exist. How far that was likely to be true I leave his readers to judge.

His experiments with local strains of Plague bacilli and his finding of decreased virulence after passage through the local rat are also interesting. If the local rat possesses as he surmises, a certain amount of immunity, it would explain our comparative freedom from the epizodtic.

VIII. ANTI MOSQUITO WORK.

The full details will be found in Mr. Benjafield's report which is appended.

New Works.—New work was carried out or continued in 7 areas. In these 17,343 yards of ditches of varying sizes were cut, 4,729 yards of concrete channels were laid, and 11,468 yards of subsoil pipes were put down.

Existing Works.—Extensions and repairs of these involved the laying of 2,985 yards of concrete channels and 4,325 yards of subsoil pipes.

The total amount spent on all Anti Mosquito Work was approximately $144,000. During the year six maintenance gangs of 20 men each were permanently employed on the maintenance of existing areas. Two gangs were permanently employed on Patrol work, six gangs on major new works, and four gangs on minor new works. In October two of these latter were disbanded. 10 masons and 10 labourers were employed until October when their numbers were reduced to 5 of each.

In my 1929 report I referred to the construction of tidal gates on the Whampoe River. The object of these was to prevent the free access of sea water to the lowlying lands adjoining the river, and in the hope of controlling the breeding of Anopheles Ludlowi which was taking place there.

Prior to the gates being erected, samples taken from 100 selected pools showed an average percentage of sea water of 10.11. After the gates were put in operation, monthly samples of water were examined from the same pools when the percentage of sea water was found to average only 2.23.

Before the gates were built A. Ludlowi was found breeding in 40% of the pools. The average for ten monthly samples, after the gates were put in operation, was 13.4%.

So that it will be seen there was both a large decrease in the salinity of the water, and a large reduction in Ludlowi breeding. It is not possible at this stage to say that the latter followed the former as, before the gates were built, Ludlowi was found breeding in pools with a percentage range of sea water varying as much as from .9 to 83. But the results so far are encouraging, and further observations will be made in this area. There is no question but that if the sea water can be kept out, and as the salt at present in the soil becomes dissolved out, Ludlowi breeding will be reduced to a minimum.

Six field workers were steadily engaged on routine surveys throughout the municipal area. They also carried out any special investigation that were required. They brought 2,406 collections of larvae to the departmental laboratory for identification.

In the Anopheline trap, which was set mostly in the Geylang-Katong districts, 4,472 adult Anophelines were caught, the bulk of them being Ludlowi. 3,361 were dissected, and 14 Ludlowi and 1 Hyrcanus were found infected with oocysts. No case of salivary gland infection was noted.

Oiling was carried out through the year—mainly in the Valley of of the Singapore River and in the Katong district. Over 3,000 gallons a month of mixture was so used.

GUNONG PULAI.

The average daily labour force was 170. The malarial parasite was demonstrated in 36 cases of fever, of whom 9 were relapse cases. Of the other 27, several had a previous history of malaria, but all have been treated as Gunong infections. This is a fever rate of 158 per 1,000 per annum. No special work was carried out here during the year.

PONTIAN.

The average daily population was 1,515. The malarial parasite was demonstrated in 194 cases. 2 of these had under 10 days residence, and 44 were definitely relapse cases, leaving 148, who, no matter what their history, are treated as fresh infections contracted at Pontian i.e. a fever rate of 97.7 per 1,000.

Practically no new work of any magnitude was found necessary during the year. The continued heavy silting of the main sand stream was a source of uneasiness as this silting has the effect of raising the subsoil water level over the main swamp below the village, and at any time may cause unsuspected breeding grounds to reappear on the surface. The maintenance gangs did their best to keep the stream clear, but something more permanent will have to be done when the health of the permanent labour force comes to be considered on the completion of the work.

IX. SUPERVISION OF MIDWIVES & INFANT WELFARE.

The nurses paid 18,373 visits including 12,582 first visits, 4,421 revisits and 1,370 wrong addresses.

First visits.—Infants seen numbered 12,059 or 68.1% of the total births as compared with 62.4% in 1929. Of these, 144 were ailing and in 399 cases the cord was unhealthy.

There were 89 cases of twins. Infants not seen numbered 652 of whom 261 had been put out to nurse, 216 were still born, 13 had been removed and 162 had died before a visit could be paid.

9,015 infants were being breast fed, 2,502 were on tinned milk, 539 were partly on breast and partly on tinned milk, while 3 were receiving other suitable foods.

Of 2,470 bottles in use 410 were of unsuitable pattern while 134 were dirty.

The condition of mothers when first visited was satisfactory in 12,153 cases and unsatisfactory in 279, while 163 had removed and 25 had died.

Of the mothers, 56 were attended at birth by medicalmen, 37 by A Class midwives, 8,227 by B Class, 1,316 by C Class, 2,506 by friends and 478 were unattended.

Of the 12,620 mothers, 9,403 were living in cubicles or single rooms and 3,217 in houses of more than one room.

Revisits.—4,030 mothers and 3,933 infants were seen on revisits. Of the former 253 were in an unsatisfactory condition, while 82 had removed, and 16 had died. Of the latter 233 were ailing, 113 had been removed, and 130 had died.

CLINICS.

During the year 12,714 new babies were taken on the Clinic registers.

In the Clinics 25,353 consultations were held by the Sisters in charge and by the Health Visitors on duty.

In the districts first visits were paid by the visitors to 12,714 infants in their houses. 71,625 subsequent visits were paid to these infants.

There were 8,375 removals and wrong addresses, while 1,211 of the Clinic babies were reported to have died.

Summarised, the work of the Clinics amounted to 119,278 visits to and consultations on 19,957 babies.

MIDWIVES.

At the end of the year there were 372 midwives on the register, but many of these were not practising. An effort will be made this year to bring the Register up to date by striking out all those who are not practising, and those who cannot be found at the addresses given.

The following shows the number and nationalities of cases attended by B and C class midwives.

Europeans	3
Eurasians	109
Chinese	7,769
Malays	1,235
Indians	325
Others	56
	9,497

A class midwives attended	104
B & C class midwives attended ..	9,497
In Hospital there were	3,280
	12,881

The number of births registered was 17,702 (89 twin births), so that approximately 73% of mothers received some kind of skilled attention at the birth of their children. The corresponding figure in 1929 was 82.1%. I can only account for this decrease by the slump, and the fact that for the very poor even the small fees charged, by some of the practising midwives, are beyond their means. It may be in part that the fact that the department supplies free midwives, in necessitous cases, is not widely enough advertised. The two municipal midwives during the year attended only 154 cases and these small figures would almost seem to lend colour to the above. Though it is the case that during 1929, the first year we ceased to pay fees to outside midwives and employed our own, the percentage of mothers attended was the highest recorded. Anyhow, whatever the reason, an effort will be made this year by advertising, and by means of the sisters and district visitors, to bring the knowledge to the people.

Though the municipal midwives attended only 154 cases, they were fully employed. They are sent to look after self-attended cases, and generally assist in the work of the Clinics when not otherwise engaged.

This seems a suitable point at which to interpose some facts and figures, which are not without interest, and which go a long way to prove the value of the department, whose activities I have just recorded above, and especially that section of it which is directly concerned with the supervision of the work of the registered midwives.

Prior to 1910 little or no control was exercised over midwives, and the practice of midwifery, so far as Asiatic Mothers were concerned, was in the hands of a few who had from use and wont come to be regarded as "expert" though they had had no scientific training whatsoever. They were limited in number, and attended only those who could afford to pay for their services. For the bulk of the poor mothers there was no "skilled" assistance available. In 1911 a nurse was appointed to this department. Her duties were to visit newly born babies, and presumably to exercise some sort of supervision over these midwives, and to help and advise the mother in those cases where no one was in attendance. In the same year Dr. Middleton introduced a scheme of training for midwives, and from that time onward the Commissioners paid for the training of a small number yearly. After training they were granted a licence. In 1912, another step forward was made when the Commissioners decided to pay the medical fee, and later the midwife's fee, in necessitous cases.

The Midwives Ordinance was passed in 1915, making the training and registration of midwives compulsory. For various reasons, however, it was not put into operation until 1917. Meantime the Commissioners continued free training of midwives, and when the Ordinance did come into force, all the municipal trained midwives were registered. In addition all the original untrained midwives were subjected to an examination and those of them, who showed any scientific knowledge at all, were admitted to the register. In 1920 the number of registered midwives was 154, while the supervising staff had been increased to four. In 1930 there were 372 midwives on the register.

In the light of the above short history, the following figures, which deal with maternal mortality over a period of 20 years i.e. from the time this department began to take control of the practice of midwifery, are of especial interest.

For comparison I give some closely corresponding figures for England and Wales including the latest I have available.

	Maternal Mortality (expressed per 1.000 births).		
	All Puerperal Deaths	Puerperal Sepsis	Other Puerperal Deaths
Singapore:—			
Decade 1910—1919 ..	10.63	4.33	6.29
1920—1929 ..	5.64	1.13	4.57
1930 ..	4.35	.67	3.68
England and Wales:—			
Decade 1911—1920 ..	3.84	1.54	2.30
1928 ..	2.92	1.18	1.73

The number of births in 1930 was 17,702. It will be agreed, I think, that the saving of maternal life shown in these figures is no small thing. I know of no cause or factor operating to produce this great decrease in maternal mortality other than improved midwifery methods and skilled supervision of midwifery practice, and I think the Municipal Commissioners can rest assured that the money they have expended in this direction has been thoroughly justified.

The most significant fact that strikes me in the Singapore figures is the large decrease in the deaths from Puerperal Sepsis. The infection in Puerperal Sepsis, as is now well known, is introduced from outside, and is associated to a great extent with faulty midwifery. This affords more clinching proof, if that were needed, that the reduction in maternal mortality must be due to improved midwifery methods.

While the deaths from other causes are also less in number, the reduction is not nearly so marked, though there is a steady improvement in the right direction. It is known that many deaths occur in the puerperium that even the best midwifery cannot prevent, but there are also many such deaths that could have been prevented by ante natal care. Puerperal Albuminuria alone in 1930 caused 24 deaths out of a total of 77. Many of these could have been avoided had the unfortunate mothers received a little ante natal advice and treatment. So too with other puerperal deaths from other causes. So that any extension of the department in the direction of ante natal work would amply repay any expenditure. I hope to so expand the department in this direction at no distant date.

Further analysis of the figures for the various races are illuminating:—

	CHINESE		MALAYS		INDIANS	
	All causes	Sepsis	All causes	Sepsis	All causes	Sepsis
1910—19 ..	8.85	3.78	16.24	6.61	16.62	8.60
1920—29 ..	4.45	.99	9.0	1.06	13.21	4.79
1930 ..	3.64	.56	6.40	.53	12.18	3.04

I must confess that the great reduction in Malay maternal mortality, especially of those deaths due to sepsis, surprises me. Many of the old Malay midwives had a number of particularly dangerous and reprehensible customs, and though the worst of them were weeded out when the Ordinance came into force, nevertheless some of those, who were admitted to the Register, and are still, a few of them, in practice, can hardly be described as modern in their methods. The improvement speaks well for the manner in which the supervising staff have carried out their duties, and for the way in which they have persuaded these midwives to abandon their old fashioned prejudices. Malay mothers too, though with them old customs die hard, have shown themselves in recent years readier to avail themselves of more skilled assistance than the old untrained midwives of their own race can give them.

The Indian figure for Sepsis, though improved; shows nothing like the same improvement as the figures for the other two races. The total number of Indian births for 1930 was 985, and it is perhaps unwise to read too much into percentages based on such small figures. At the same time the average over the ten year period is much higher than in the other races, and there must be some reason for it. I think it is to be found in the fact that Indian women are as a rule in poorer circumstances, and in many cases cannot afford to engage the services of a trained midwife. At any rate in 1930 the supervising nurses reported that 33% of the Indian women visited were either unattended or attended by friends only.

It will be further seen with regard to Indian women that there has been no reduction, in fact there has been an increase, in the number of deaths due to other causes. Much has been written elsewhere on the quite unnecessary maternal mortality amongst Indian women, and I do not propose to add to it. At the same time it is quite obvious that certainly with regard to Indian, and, to a lesser extent, with Malay women, there is a crying need for ante natal work. Indian women in Singapore are very ready and even anxious to make use of our Clinics for their babies, and I am confident they would be equally ready in time to make use of the facilities of a sympathetically conducted Ante Natal Clinic.

X. FOOD AND MARKETS.

Despite the slump there was an increased turnover in the markets of nearly all articles of food.

Wet fish sales showed a 4% increase over the 1929 figures, but the revenue derived from the commission charged for the auctioning of the fish fell by 9%, showing that the wholesale price of fish was substantially lower. I regret to say, however, that the retail price of fish was little different, so that the consumer got no benefit from the lowered wholesale rate. It ought to be possible somehow to prevent profiteering on the part of stallholders in this fashion, and it seems to me to be a matter worthy of the closest investigation. It is, however, a very difficult problem.

The returns for 1929 of Foodstuffs passing through the market, and unsound foodstuffs destroyed, were unaccountably omitted from the 1929 report. They are published this year with the report under review.

FOOD SHOPS, ETC.

Licenses were issued for:—

451	Coffee Shops.
585	Eating Houses.
107	Meat Shops.
2	Fish Shops.
21	Bakeries.
3	Biscuit Factories.
35	Cake Shops.
10	Aerated Water Factories.
233	Milk Vendors.

In 1929 licensed coffee shops and eating houses totalled 899, whereas this year they number 1,036.

To have a 15% increase in the number of these licensed premises in one year, and a slump year at that, is, I think, rather wonderful, and will, I hope, give pause to those who are ever ready to take up the cudgels on behalf of the "poor" hawker.

I put the increase down to several reasons. One is that late in 1929, in a sincere desire to get the hawker off the street, and into sanitary premises, we abated somewhat our requirements as to the type, etc., of premises we were prepared to license. This resulted immediately in an increased demand for licences. We have also, of late, allowed licence holders, provided the premises were big enough, and they were willing to erect proper stalls, to sublet part of their shops to hawkers now selling on the five foot ways outside. This policy has also helped in getting the hawker inside. Finally the police have kept up their intensive campaign against the itinerant and the unlicensed hawker.

I think the above bears out what I have been preaching now for years viz. that if we adopt a policy of gradually cutting down the numbers of hawkers, more and more sanitary shops will be opened until finally no hawkers will be found except in the outlying districts. This has been my invariable experience in localised areas and the above proves the truth of it generally. Even the hawker himself, if he can be assured of protection from others of his own kidney, will open a shop of his own or take a stall in one. But he won't give up his pitch on the street until he is certain no one else will get it.

In my campaign for clean food I am disappointed I have not got the complete backing especially of those who could help me most. I would ask them, and those who follow them, to accept my assurance, based on long experience and observation, that it is a policy worth following. To open a coffee shop or an eating house is the ambition, and the legitimate ambition of almost every cook and house boy in Singapore. And if he can see even the smallest profit, he will put all his savings and all he can borrow into one. By training he is one of the most suitable persons to be engaged in dispensing food to the public but, that apart, he is, more often than his enemy the hawker, a useful rate paying member of the community and deserves every encouragement. He risks his money and accepts all we demand of him in good faith, and I say it is the duty of the Commissioners to give him their complete backing, instead of allowing him to be forced into bankruptcy by the hawker who almost with impunity is allowed to hawk his wares on his very doorstep.

XI. PLACES OF PUBLIC RESORT.

Theatres, Hotels, Public houses, etc., were inspected periodically, and as often as required by the licensing authorities concerned.

XII. SLAUGHTER HOUSES.

During the year 288,885 animals were received for slaughter.

The figures were as follows:—

Pigs	235,576
Sheep	30,173
Goats	7,076
Oxen	15,619
Buffaloes	441
	288,885

1,589 carcases were totally condemned. These included 1,551 pigs, 17 sheep, 14 oxen, 6 goats and 1 buffalo. 1,353 of the pig carcases were "measly" while 12 pig and 8 oxen were tubercular. Many other parts of carcases were condemned and destroyed. There was evidence of Tuberculosis in 356 pigs and 243 oxen.

The new Pig Abattoir in French Road was opened in July. There were the usual little difficulties associated with the introduction of new methods but now everything is running satisfactorily, and the new Abattoir is proving a great success.

There was at first a certain amount of distrust from the general public who were not accustomed to chilled Pork and active opposition from the wholesale Pork butchers. Indeed a good deal of the expression of the first was "engineered" by the latter to whom it was evident, the new methods could not appeal. The reason was fairly obvious as they knew that the improved supervision and inspection rendered possible by day slaughtering in a modern Abattoir must inevitably result in an increased number of condemned carcases, and must put an end once for all to the many little abuses which were more or less impossible of detection under the old arrangements for slaughtering pigs.

A recrudescence of illegal slaughtering followed the opening of the new Abbattoir but in many instances the carcases seized were found to be diseased showing that it was due to a desire to avoid condemnation and seizure rather than to a genuine desire to supply their customers with pork slaughtered by the old methods.

It took only a month or two, however, for things to settle down. The Pork butchers have accepted the position and there is even evidence accumulating that the Public now prefer the chilled pork.

Mr. Wilson, the Superintendent of the Abattoirs, is to be congratulated on the highly efficient and tactful way in which he handled what was at times an exceedingly difficult situation.

The reconstruction of Jalan Besar Abattoir to enable all other slaughtering to be carried out there, and making it possible to close down Pulau Saigon Abattoir, was nearing completion at the end of the year.

XIII. OFFENSIVE TRADES.

429 licences, mostly for laundries, were issued during the year, the fees amounting to $2,690.

For the past two years this department has from its votes to a certain extent subsidised a native Buffalo Dairy. All members of the staff have spent a good deal of time over it and I am now quite satisfied that, with the type of individual at present employed in this and similar dairies, expert supervision can never be relaxed even for a day. I am coming to the conclusion that if these dairies are to carry on at all, some system of compulsory pasteurisation must be introduced.

That fresh milk, however, can be produced in a clean state has been amply proved by the Singapore Cold Storage Company who have recently opened a Dairy farm in the Bukit Timah district. It is stocked with imported cows and everything is being run on the most modern up to date lines. It turns out a product that is always of a high standard of purity. It is deserving of every encouragement as it supplies a long felt want in Singapore. To all those mothers especially, who have the welfare of their children deeply at heart it should prove a boon of the first magnitude.

XIV. BURIAL GROUNDS.

The number of burials in municipal cemeteries was as follows:—

	1930.	Since opening.
Bidadari—		
Protestant	163	2,846
French Roman Catholic ..	214	3,319
Portuguese Roman Catholic ..	54	1,201
Pauper	784	10,968
Carried forward ..	1,215	18,334

	1930.	Since. opening.
Brought forward ..	1,215	18,334
Serangoon Road—		
Mohammedan	1,313	7,453
Pauper	154	748
Bukit Brown—		
Chinese	782	4,753
Pauper	2,396	6,488
Hindoo Cemetery—		
Hindoos	349	1,659
Paupers	104	552
Cremations	144	310
Infectious Diseases—		
Serangoon Road	32	659
Yeo Chu Kang Road	—	555
	6,489	41,511

The Burial ground inspector made 1,665 inspections during the year and attended 500 exhumations.

The total number of burials inside municipal limits for the year was 8,864 made up as follows:—

Europeans	72
Eurasians	126
Chinese	6,412
Malays	1,606
Indians	618
Others	30
	8,864

In addition to municipal cemeteries there are in use 19 Public and 94 Private cemeteries. Practically all of these are for Chinese.

XV. STAFF.

I went on long leave in March returning in October. Dr. Canton went on long leave in July and Dr. Gilmour, Bacteriologist, in December. Dr. Spence, Lady Medical Officer, resigned in June. Dr. Elsie Crowe was appointed to the vacancy and arrived in the Colony late in November. Mr. O. L. Velge was appointed to the new post of Office Assistant in January.

Sanitary Inspectors Koek, Conceicao and Maniam after being seconded for six months to attend the local school, were successful in obtaining the diploma of the Royal Sanitary Institute.

HEALTH OF MUNICIPAL SUBORDINATE STAFF.

The number of cases of sickness treated was 15,675. There were 1,621 sent to hospital and 102 to various Clinics. 23,569 days sick leave were granted, 14,979 dressings were applied in the Dispensary where the daily attendances totalled 34,727. Private practitioners treated 365 and the medical officer in charge of staff paid 196 visits to patients in their homes.

XVI. GENERAL.

There were 4,316 notices including 588 intimations served during the year which, with 430 from the previous year, made a total of 4,746. Of these, 3,837 were complied with.

There were 26 arrest cases mostly for selling milk without licence.

There were 42,676 visits of inspection paid by the Sanitary Inspectors, 2,518 prosecutions with 1,558 convictions with fines imposed amounting to $13,225.50 while 334 prosecutions were withdrawn, and 626 could not be served.

The following reports and returns are appended.

Anti Mosquito Report.
Report of the Analyst.
Report of the Bacteriologist.
Report of the Superintendent, Middleton Hospital.
Report of the Market Inspector.
Return of Inspectors' Prosecutions, etc.
Return of Notices.
Summary of Arrest Cases.
Return of Licences for Offensive Trades.

In conclusion I wish to record my deep appreciation of the way in which all members of the staff have worked together for the benefit of the department.

I have the honour to be,

Sir,

Your obedient servant,

P. S. HUNTER,

M.A., M.B., Ch.B., D.P.H.,

Municipal Health Officer.

Municipal Health Office,
Singapore, 31st March, 1931.

The Municipal Health Officer,

Sir,

I have honour to forward the following report on Anti-mosquito measures carried out in the Municipal area during the year 1930.

ANTI-MALARIAL WORKS.

New works were commenced or continued in the following areas, in all of which breeding places of dangerous anopheline mosquitos were found.

1. Area No. 107 — Wayang Satu.
2. ,, ,, 111 — Thomson Road.
3. ,, ,, 100 — Adam Park.
4. ,, ,, 113 — Kheam Hock Road.
5. ,, ,, 115 — Alexandra Road.
6. ,, ,, 117 — Telok Blangah Ravine.
7. ,, ,, 118 — Kallang Reservoir Ravine.

AREA No. 107—WAYANG SATU.

The work in this area was completed during the early part of the year.

There are five branch ravines running from the main ravine, and in these 131 wells were filled and 812 trees removed.

Anti-malarial concrete channels were laid in the floor of all five branches. and seepages trapped by laying subsoil pipes.

This called for the use of 1,919 eighteen-inch, 111 fifteen-inch, 15 nine-inch concrete inverts, 4,129 eighteen-inch concrete slabs, 956 eight-inch and 3,452 five-inch subsoil pipes.

The area now contains 8,585 lineal feet of revetted concrete channel drain and 17,102 lineal feet of subsoil pipes.

AREA No. 111—THOMSON ROAD.

The earth drainage of this area was completed. An additional 706 yards of earth drain were cut and 34 trees removed.

The area now contains 2,027 yyards of earth drains.

AREA No. 100—ADAM PARK.

The drainage of this area which consists of seven subsidiary ravines, with one main outlet was completed. 37 wells were filled in and the following materials laid:— 265 twenty-one-inch, 943 eighteen-inch,. 485 fifteen-inch, 22 nine-inch inverts, 4,067 eighteen-inch concrete slabs, 2,778 eight-inch and 8,014 five-inch subsoil pipes.

The completed area contains 6,238 lineal feet of revettted concrete channel drain and 19,528 lineal feet of subsoil pipes.

AREA No. 113—KHEAM HOCK ROAD.

The earth ditch in this area was extended a further 110 yards making 390 yards in all, 76 trees were cleared from the ravine floor, 8 wells were filled in, and outcropping seepages trapped by laying 550 five-inch subsoil pipes which discharge into the Anti-malarial earth ditch.

AREA No. 115—ALEXANDRA ROAD.

This area, which is situated on the south side of Telok Blangah ridge near Alexandra Road consists of two main ravines which join one another near junction of Alexandra Road and Telok Blangah Road.

There are five subsidiary ravines, two of which join one ravine and three join the second ravine.

A considerable number of outcropping granite boulders were met with in all the subsidiary ravines.

The floors were cleared of all trees and undergrowth, 204 ponds were drained and levelled off, 16 wells filled in, 526 trees removed. 4,836 yards of main earth ditch were cut during the course of deepening and straightening the stream beds, and 9,190 yards of subsidiary drain to prevent scour in th ravine floors.

The section of this area which runs parallel to Alexandra Road was dealt with permanently and the following materials laid:— 1,015 twenty-one-inch, 31 eighteen-inch, 34 fifteen-inch concrete inverts, 3,146 eighteen-inch concrete slabs, 700 eight-inch and 5,261 five-inch subsoil pipes.

This completed area contains 2,160 lineal feet of revetted concrete channel drain and 3,961 lineal feet of subsoil pipes.

A wooden bridge was constructed over the channel to give access to the temple on the far side of the ridge.

AREA No. 117—TELOK BLANGAH RAVINE.

This area is situated south of the Telok Blangah Ridge between Alexandra Road ravines and Wishart ravine. The outlet connects with the road side drain of Telok Blangah Road.

The whole area was cleared of undergrowth, 85 trees removed from the floor, 3 ponds drained and 1,478 yards of main earth ditch constructed. Half way throughout its length a huge granite boulder some 25 feet in height entirely blocks the ravine floor. Owing to this blockage the water from above spread itself over the rocky face where a large number of A. maculatus was collected.

To deal with this S. V. shaped drain was constructed of granite blocks set in cement about 3 feet in height down the centre of the rock face for a distance of 20 yards and to prevent scour at the base, a spill-way was built with a series of herring bone wells to break up the rate of flow of the falling water.

AREA No. 118—KALLANG RESERVOIR RAVINE.

This area is situated south of the Kallang reservoir near the 6¼ mile stone Thomson Road.

The outlet drain (which runs parallel to the reservoir overflow to Thomson Road) was deepened by 2½ feet for a distance of 170 yards and the 18 inch culvert at Thomson Road was taken up and replaced by a 3 foot hume pipe culvert at a lower level.

It was now possible to drain the swampy ravine floor above which was done by constructing 844 yards of main earth drain.

MAINTENANCE OF EXISTING WORKS.

The total number of areas at present under maintenance is 118.

Extensions and repairs to existing works were carried out as follows:—

AREA 41—INVERTURRET RAVINE.

The earth ditch in this area was deepened and a concrete Anti-malarial channel was constructed throughout its length.

The total length of concrete revetted channel laid was 2,631 lineal feet.

AREA No. 104—KATONG.

In order to control the breeding of A. ludlowi over the old fish pond site near the Geylang river, a series of ditches was cut through the swampy area and the earth excavated was used for filling isolated ponds and raising the level of the land.

41 ponds were filled and 2,449 yards of main drain excavated.

AREA No. 69—BALESTIER ROAD.

420 five-inch subsoil pipes were laid to drain seepages.

AREA No. 8—BARKER ROAD

300 feet of five-inch subsoil pipes were laid to drain seepages.

AREA No. 84—CHANCERY LANE.

222 eighteen-inch revetment slabs were laid to support the banks of the drain and 201 five-inch subsoil pipes laid to drain seepages.

AREA No. 55—FORT CANNING.

389 feet of five-inch subsoil pipes were laid to drain seepages.

AREA No. 28—ORCHARD ROAD.

200 feet of five-inch subsoil pipes were laid to drain seepages.

AREA No. 33—RIVER VALLEY ROAD.

762 feet of five-inch subsoil pipes were laid to drain seepages in several places in this area.

A low retaining wall was built for a distance of 200 feet to prevent the bank from slipping during the drying out process.

AREA No. 13—STEVENS ROAD.

75 feet of five-inch subsoil pipes were laid to drain seepages.

AREA No. 94—BUSHY PARK

416 feet of five-inch subsoil pipes were laid to drain seepages.

AREA No. 35—TIONG BAHRU.

General clearing was carried out over this area and exposed seepages trapped by laying 638 feet of five-inch subsoil pipes.

AREA No. 66—TANGLIN ROAD RAVINE.

170 feet of five-inch subsoil pipes were laid to drain seepages.

AREA No. 81—MOUNT ROSIE.

50 feet of five-inch subsoil pipes were laid to drain seepages.

AREA No. 22—JERVOIS ROAD.

250 feet of five-inch subsoil pipes were laid to drain seepages.

AREA No. 52—TANGLIN BARRACKS.

293 feet of five-inch subsoil pipes were laid to drain seepages.

AREA No. 4—CLAYMORE.

A length of 315 feet of nine-inch concrete channel was laid from the main Anti-malarial channel so that the outlet from a length of 150 feet of five-inch subsoil pipes could be connected.

AREA No. 42—GRANGE ROAD.

247 feet of five-inch subsoil pipes were laid to drain sepages.

AREA No. 93—BUKIT TIMAH FILTERS.

A length of 17 feet of nine-inch channel was laid to take the discharge from 190 feet of five-inch subsoil pipes laid to drain seepages.

AREA No. 95—NASSIM ROAD.

371 feet of five-inch subsoil pipes were laid to drain seepages.

AREA No. 119—SCOTTS ROAD.

232 feet of nine-inch concrete channel were laid to take the discharge from 405 feet of five-inch subsoil pipes laid to drain seepages.

AREA No. 71—TANGLIN ROAD POST OFFICE.

The complete drainage of this area was carried out. 66 trees were removed, 142 feet of fifteen-inch, 208 feet of twelve-inch concrete channel and 552 fifteen-inch concrete slabs were laid. To trap seepages opposite the Post Office 435 feet of five-inch subsoil pipes were laid.

AREA No. 21—JERVOIS ROAD.

200 feet of five-inch subsoil pipes were laid to drain seepages.

AREA No. 90—OUTRAM ROAD.

315 feet of five-inch subsoil pipes were laid to drain seepages.

AREA No. 88—JEWISH CEMETERY.

160 feet of five-inch subsoil pipes were laid to drain seepages.

AREA No. 49—SWETTENHAM ROAD.

92 feet of five-inch subsoil pipes were laid to drain seepages.

A. maculatus or A. ludlowi were found breeding in the above areas.

OTHER ANTI-MALARIAL AREAS.

Minor repairs and extensions were carried out in many other areas and called for the use of the following materials:—

134 twenty-one-inch, 1,234 eighteen-inch, 185 fifteen-inch, 983 twelve-inch, 135 nine-inch concrete inverts, 317 eighteen-inch, 2,269 fifteen-inch concrete slabs, 3,998 eight-inch, 2,249 five-inch subsoil pipes and 28 Bakau Piles.

MOSQUITO SURVEYS.

Systematic surveys were carried out during the year, and 2,406 collections of mosquito larvae were examined and identified in the laboratory. Collections of adult mosquitoes were made on 199 nights during the year by means of mosquito traps. The following total catches were recorded:—

A. ludlowi 3,239, A. hyrcanus 525, A. kochi 79, A. vagus 631. Of these 3,361 were dissected and malarial infection was found in 14 A. ludlowi and one A. hyrcanos. No salivary gland infectioins were noticed.

GENERAL ANTI-MOSQUITO WORKS.

Patrol Gangs cleared and regraded 545,921 yards of earth drains filled or drained. 196 ponds and 260 earth wells and collected 12,898 baskets of tins.

Mosquito larvae were found by Sanitary Inspectors in the course of their ordinary rounds in 10,038 houses and compounds or 23.52% of those visited.

709 notices under the Destruction of Mosquitoes Ordinance were served during the year.

37,559 gallons of Anti-malrial mixture were used in spraying mosquito breeding places, the bulk of the oiling being done in the valley of the Singapore River and in the swampy district of Katong.

I have the honour to be,

Sir,

Your obedient servant,

A. BENJAFIELD,

Chief Sanitary Inspector,

For Deputy Health Officer.

Singapore Municipality

Twenty Third Annual Report

of the

Municipal Chemical Laboratory

For the Year

1930

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by

R. E. WILLCRESS, A.R.C.S., B.Sc., A.I.C.

MUNICIPAL HEALTH OFFICE

Singapore, 10th February, 1931.

The Municipal Health Officer.

Sir,

I have the honour to submit the following report on the work carried out in the chemical laboratory during 1930.

The total number of samples analysed during the year was 17,313, the detailed figures for which are given in the following table.

Public Water Supply.	Routine samples from Singapore Island ...	9,114
	Routine samples from Johore	3,325
Sewage Purification.	Samples from M. Sewage Works, Pumping Stations etc.	2,477
	Samples from House Installations	365
Foods, Drugs and Miscellaneous Samples.	From Health Department	1,299
	From Engineering Department	98
	From Electrical Department	156
	From Water Department	437
	From Gas Department	35
	From Other Departments	7

MUNICIPAL WATER SUPPLY.

The Municipal public water supply of Singapore was taken, during the year, from the three Island impounding reservoirs viz. MacRitchie, Peirce and Seletar and from the two Johore catchments viz. Pulai III catchment and Pulai II (Sultan Ibrahim) impounding reservoir. The majority of the water from Seletar reservoir was pumped into Peirce reservoir catchment, the remainder being used, after chlorination, to supply Seletar village. The water from Pulai III catchment joins the Pulai II reservoir through a tunnel.

The approximate volumes of water drawn off from the various catchments, given as averages per day, are as follows:—

Peirce reservoir catchment	7,384,000	gallons.
Seletar reservoir catchment	958,000	,,
MacRitchie reservoir catchment ...	3,965,000	,,
Sultan Ibrahim reservoir catchment ...	4,818,000	,,
Average daily consumption ...	17,125,000	gallons.

The whole of this water was filtered at Woodleigh, Bukit Timah Road or at Pulai. The Johore filtered water supplied Johore Bahru, H. M. Naval Base and Pearls Hill service reservoir. The water filtered on Singapore Island was pumped to Fort Canning service reservoir or passed direct into the distributing mains.

The chemical characteristics of these waters were determined by daily routine analyses and the samples analysed were taken from each point of the purification system embracing the catchment area streams, impounding reservoirs, water before and after filtration, service reservoirs and tap supplies. There were never any traces of sewage contamination in these samples and the iron and other suspended matter in the Singapore Island waters kept reasonably low in value. The chemical characteristics of the Johore raw water varied very considerably, however, during the year.

TABLE A.

This table, shown at the end of this report, gives average results and variations in the chemical characteristics of the various raw waters used both in Singapore Island and Johore.

1. **Singapore Island Water.** The method of treatment of the Island raw water consists of filtration through slow sand filters with chemical treatment before and after filtration. The treatment before filtration which has been found to give the best results consists of dosing with small quantities of lime to give an effective concentration of approximately 0.3 parts per 100,000. In addition the raw water passing to any filter bed which has just been started after cleaning etc., is dosed for the first six hours only with approximately 0.35 parts of aluminium sulphate per 100,000. The lime has the effect of "fixing" the carbon dioxide which is produced, particularly during the hotter months of the year, by decomposition of the vegetable matter on the filter bed and thus prevents the solution of any iron oxide deposited on the filter bed. Very similar difficulties in working slow sand filters have been experienced in Northern India and these are described in the Indian Medical Gazette (Feb. 1931) by Mr. Mandal, Public Analyst, Bihar and Orissa. The article is also interesting as it shows that the lake supply varies in character in a similar manner to that which we have experienced since Sultan Ibrahim reservoir was first used. The aluminium sulphate enables the maximum rates of filtration to be attained more quickly by virtue of the fact that the formation of a "skin" on the filter bed is hastened. Experiments carried out in which continuous dosing with alum but no lime were employed were not successful. Immediately after filtration the Island supplies were dosed continuously with chlorine solution from "Paterson" chloronomes, the concentrations during the year being as follows:—

CHLORINATION AT BUKIT TIMAH ROAD.

January to June	0.35 p.p.m.
July and August	0.70 p.p.m.
September to December	0.45 p.p.m.

CHLORINATION AT WOODLEIGH.

January to May	0.33 p.p.m.
June	0.60 p.p.m.
July and August	0.33 p.p.m.
September to December	0.40 p.p.m.

If the quality of the filtered water, as determined bacteriologically, is good, it is obviously not necessary to use large concentrations of chlorine and the chlorinated water need only show very small traces of free chlorine immediately after leaving the clear water tank. There have been occasional complaints of an "iodoform" taste in the tap supplies and this, due probably to a combination of chlorine with traces of phenolic compounds in the water, could doubtless be largely overcome by reducing the chlorine dosage to a minimum. It would be interesting to ascertain the possible advantages of using chloramine instead of chlorine for effective bacterial sterilisation.

TABLE B.

This table gives the averages and ranges of the daily analyses of samples taken from each of the clear water tanks, from the tap supplies and from the mixture of sea and Municipal water supplied to the Y.M.C.A. swimming pool at Fort Canning.

2. **Johore Water.** Under the most favourable conditions the raw water from Johore has characteristics very similar in nature to those of the Island supply. These characteristics, however, are by no means constant and the amount of solids in solution and suspension vary with climatic conditions. Before impounding took place at Pulai the stream always showed such variations and the conditions now that the impounding reservoir is full, are just as variable during the rainy season. These variations involve such large increases in the iron contents etc. of the water to be treated that the existing filtration plant at Pulai is not, at such times, capable of anything like efficient filtration. Work is now being undertaken to erect the extra necessary equipment.

TABLE C.

This interesting table is compiled from the averages and ranges of analyses carried out fortnightly throughout the year, the samples all being taken from the reservoir near the main dam. Although the water drawn off from the reservoir for treatment in the filter house was taken from a depth of approximately 5 ft. to 20 ft. from the surface (i.e. from the top outlet in the dam) it was often found that this water had qualities similar to that at greater depths.

TABLE D.

The results given in this table clearly show the differences in the quality of the water treated month by month. With the exception of the months January, February, October and November the filtered water never contained an average of more than 0.02 parts of iron per 100,000 and was reasonably clear in appearance. The filters, eight in number, are of the Paterson rapid filtration type and they were first put in use a week or so before the beginning of the year. The filtration troubles experienced during the first two months of the year were mainly due to the fact that the alum dosage was too high, causing generation of carbon dioxide in the filter bed with subsequent solution of the deposited iron. During this period and also during the next two months this solution effect was prevented by the addition of larger doses of lime (up to 1.5 grains per gallon) but the sand of the filter beds was constantly choked etc. and needed frequent back—washing. Finally, on advice in May from London, the alum dose was reduced to 0.5 to 1.0 grain per gallon and the addition of lime before filtration was discontinued. This dosage was supplemented by the addition of 0.35 to 0.50 grain of lime per gallon after filtration with the view of increasing the natural alkalinity of the filtered water. From the 23rd October until the end of the year the iron content of the raw water increased very considerably and the majority of this iron, instead of being mostly in suspension, was in solution as ferrous bi-carbonate. In view of the inadequate arrangements for treating such a water whereby the iron could be thrown out of solution and deposited before it reached the filter beds, it was essential to add large doses of lime before filtration (3 to 4 grains per gallon). This was achieved by alteration of the method of adding chemicals and from the 5th November the filtered water was kept free from iron. The treatment with lime was augmented by the addition of sufficient alum before filtration to give a "floc" enabling the suspended matter to be retained on the surface of the filter beds.

TABLE E.

This table will be of interest as it shows the chemical qualities of the Municipal water used in Singapore. Average analyses from two tap supplies are given as the water from Havelock Road tap is that taken from Johore and the Coleman Street water from the Island supply.

In conclusion, the results of experiments carried out during the year, confirm previous results which showed that the tap water has, at the moment, sufficient solvent action on metals, to preclude the use of lead and copper piping.

SEWAGES, EFFLUENTS ETC. FROM THE MUNICIPAL SEWAGE WORKS.

The Sewage Disposal works at Alexandra Road treated an average volume of 3,524,000 gallons per day, pumped from the three centres at People's Park, River Valley Road and Albert Street. At Albert Street and People's Park Stations, night soil from nearly 13,000 latrines was dumped during the year. The night soil from practically four-fifths of these latrines was collected on alternate days only.

The quantity of sewage dumped in this manner shows an increase of nearly one-third of that for 1929 and the volume of sewage treated at Alexandra Road is nearly ten per cent higher than the 1929 figure. The increase in the number of properties connected to Municipal sewers during 1930 was nearly 50 per cent. The whole of this sewage was subjected to purification, the majority being passed through the sedimentation tanks to the percolating filter beds and finally through the humus tanks to the Alexandra Road stream. Approximately one-fifteenth of the total sewage was subjected to special methods of purification which were tried out during the year.

In regard to the usual method of purification, there have been marked improvements in the working of the sedimentation tanks but for some reason this has not resulted in the anticipated improvement in the running of the percolating filter beds. The efficiency of the humus tanks was improved by small alterations towards the end of the year.

TABLE F & G.

These two tables give the averages and ranges of daily analyses of the crude sewage, sedimentation tanks' effluent, filter beds effluent and humus tanks' effluent.

Crude Sewage. Although the quantity of suspended matter in parts per 100,000 is a little smaller than during 1929, the oxygen absorption in 4 hours and ammonia values show very decided increases and these increases are reflected throughout the entire purification system. These increases are probably largely due to the increase in night soil dumping. The crude sewage was practically neutral in reaction, having an average PH value of 7.2. The average amount of organic solids in colloidal and true solution was 63 parts per 100,000.

Detritus Tanks. These tanks abstracted 13.4 per cent of the solids in suspension in the crude sewage, the monthly percentages ranging from 9.1 to 17.4. These values are too high as the solids abstracted consist largely of organic matter whereas the tank is designed to abstract inorganic material. The floors of these three tanks are being raised to reduce the capacities and thus ensure a higher velocity of the sewage through the tanks.

Sedimentation Tanks. These 32 tanks, built on the Imhoff principle, have a capacity of 550,000 gallons and this gives a 2.65 hours period of detention at maximum rate of dry weather flow.

The average amount of solids retained in these tanks, taken as a percentage of the solids in suspension in the crude sewage, is more than double that for the preceding year. The percentages of solids retained amount to 44.1 as against 20.3 for 1929. From a few preliminary experiments carried out, I am of the opinion that these tanks are now working at maximum efficiency for the type of sewage which has to be treated. Something like 20 per cent of the solids passing through these tanks are for all practical purposes non-settleable.

TABLE H.

Filter Beds. Table H shows the monthly averages of daily analyses of the effluents from the 38 percolating filter beds-split up for simplicity into two blocks comprising the 17 old beds (A & B) and the 21 new beds (C & D). The effluent from Blocks A & B went off in quality from October due to admixture with the partially purified sewage from the Bio-Flocculation plant, which will be described later.

The quality of the effluents from all these beds is not so good as might have been expected and the beds have "ponded" a good deal during the year. Each of the 38 beds was "rested" in turn during the year. and the Municipal Sewerage Engineer's figures show that the 17 old beds were worked longer than the 21 new beds, the average periods of rest being in each case 5 months and 6 months respectively for the year. During the working periods the rate of dosing averaged 92 gallons per cu. yard of bed per day. Special experiments, which are referred to below, have been carried out some with success, with a view to keeping these beds in good working order.

Finally Purified Effluent. The humus tanks' effluent from the 17 old beds has improved in quality but the results from the 21 new beds are, with the exception of suspended matter, less satisfactory than during the preceding year.

SPECIAL EXPERIMENTS CARRIED OUT AT ALEXANDRA ROAD WORKS.

1. **Chlorination.** In my annual report for 1929 I suggested that the dose of chlorine necessary to clean the percolating filter beds should be increased considerably and American experiments were quoted which had been reported as successful in freeing beds from slimy growths etc. Separate experiments were done on two filter beds, one of which, No. 17, was constructed of granite with the top foot of coral and the other, No. 18, of coral throughout. The top surface of No. 17 had a leathery "skin" on the coral whereas the similar "skin" on No. 18 was removed by handpicking before chlorination. The Paterson chloronome was moved alongside the bed and the strong chlorine water introduced into the branch feed pipe conveying the sewage to the bed. For one month before the period of chlorination, the bed effluent was analysed daily to enable comparative results to be obtained. Preliminary experiments showed that a dose as high as 25 p.p.m. of chlorine was required to give small traces of residual chlorine. The sewage flowing to Bed No. 17 was dosed with 36 p.p.m. of chlorine for ten days and then with 55 p.p.m. for two days and the effluent analysed daily. The result during the pre-chlorination and chlorination periods were practically identical and the thick leathery "skin" on the bed was hardly affected, showing no signs of breaking up.

The results obtained by dosing the sewage flowing to the relatively new coral bed, No. 18, with 50 p.p.m. of chlorine were very similar and a hole dug into the bed itself showed that the earthy material which had previously collected was not affected.

The effect of these, and also much smaller concentrations of chlorine, however, is to reduce the smell and the following programme of chlorination was accordingly carried out during the year:—

January to June	8 hours per day One week in three	Rate 2.34 p.p.m.
July—August 11th	8 hours per night One week in three	Rate 4.72 p.p.m.
August 12th—October 16th	24 hours daily	Rate 1.70 p.p.m.
October 17th—December 31st	8 hours per night	Rate 1.70 p.p.m.

Further experiments were carried out to decide on the advisability of dosing the sewage at the pumping stations with chlorine with a view to counteracting the effect of nightsoil dumping. The results obtained showed conclusively that reasonable doses of say 10-20 p.p.m. did not have any marked effect, beyond reducing smell.

2. **Improvements in Percolating Filter Beds.** Many experiments have been carried out in an attempt to prevent the beds becoming choked with deposited solids with consequent ponding." The most successful method tried was that of washing the bed, after handpicking, with a very strong jet of water pumped from the clear liquid in the adjoining humus tanks. The three beds washed, Nos. 18, 19 and 20, required no attention for four months after washing and the quality of the effluent had improved so remarkably that the results for these four months are given below, together with the average analysis of the effluents from the remaining untreated beds.

TABLE TO SHOW THE EFFECT OF WASHING THE FILTER BEDS.

Parts per 100,00.	Ammonia.		Oxygen absorbed in 4 hours.	Suspended Matter.	Nitrates as Nitrogen.
	Free.	Albuminoid.			
Effluent from					
(a) Washed Beds	0.53	0.13	1.57	3.40	1.1
(b) Remaining Beds	1.30	0.18	1.91	4.04	0.6
% Purification	59	28	18	19	83

The necessary pipe lines are being laid down shortly to enable each filter bed in Block C & D to be washed with the clear purified humus tanks' effluent as required. It will be advisable to remove the top layer of dirty coral before the bed is cleaned in this manner.

The effect of replacing the top six inches of coral with 2½ inch. granite was tried out for several months. The chemical analyses of the effluent from such a bed were practically the same as those from the other beds and the only difference observed was that the hard leathery deposits did not form on the granite surface, which remained comparatively clean after months of working. A hole dug into the bed seemed to show, however, that the troublesome deposits formed on the top of the coral, some six inches from the top of the bed and these were the deposits which caused ultimate "ponding."

There is no doubt in my mind that the working of the filter beds will be tremendously improved by the use of automatic screens of about 1/16 inch mesh. This size of screen retains so much of the vegetable etc. matter not settled out in the sedimentation tanks that the screen quickly becomes choked completely. Work in this direction will be carried out during 1931.

3. **Alternate Methods of Purification of the Sedimentation Tanks' Effluent.** In my annual report for 1929, I mentioned that the bio-aeration method of purifying the sedimentation tanks' effluent had only been partially successful in that the serious "bulking" of the activated sludge used had prevented efficient working of this experimental unit, although the quality of the filtered effluent had remained fairly good. It was considered that, if this sludge could be kept properly reconditioned after it had purified the incoming sewage by its screening action then the unit should be able to tackle efficiently far larger volumes of sewage.

The unit, without any alterations, was worked intermittently from the beginning of the year until July and the result obtained confirmed last year's conclusions viz. the unit could not treat more than 200,000 gallons per day and the activated sludge deteriorated so badly from time to time that it was advisable to stop the unit to allow the sludge to be reconditioned. Addition of alum to the sewage in the unit did not improve the settlement of solids in the Dortmund settling tanks.

This experimental unit was accordingly altered in design to enable the activated sludge to be reconditioned in a separate series of aeration channels and this sludge was then pumped to the "contact" channels where it mixed with the sewage to be purified. After leaving the "contact" channels the purified sewage and sludge passed to the Dortmund tanks, where the solids were deposited and pumped back either to the reconditioning channels or, if not required, bye-passed to the crude sewage inlet well. The altered unit was started on the 4th October and treated a daily average of 711,480 gallons of sewage continuously during the remainder of the year. The quantity of activated sludge retained in the reconditioning channels was maintained at 15.5%, as determined by regular settlement tests and the average period of retention in these channels was 31.5 hours. The reconditioned sludge was added to the sewage treated in the proportion of approximately 1 to 9 and the resulting mixture contained 1.62% of settled sludge. The period of treatment in these contact channels averaged 1.92 hours. It was found that the sludge in the reconditioning channels could not be prevented from "bulking" very considerably but this should not be a very serious feature in a plant of this kind. The great improvements achieved are illustrated in the following tables, which compare the results obtained with those of the sewage treated and with the old bio-aeration unit effluent.

TABLE SHOWING THE WORKING OF THE NEW BIO-FLOCCULATION EXPERIMENTAL PLANT.

Parts per 100,000.

Effluent from:—	Rate of working in gallons per day	Ammonia.		Oxygen in 4 hours.	Suspended Matter.	Nitrates as Nitrogen.
		Free.	Alb.			
Bio-Floc. Unit	711,480	3.78	.33	3.10	3.75	.2
Bio-Aeration Unit ..	212,550	2.51	.17	1.26	3.13	.2
Sewage treated	...	4.30	.67	6.08	15.30	...

This table shows that the effluent from the new unit has very little more suspended matter than that from the old bio-aeration unit, which worked at a very much slower rate. This partially purified effluent could probably be put through the percolating filter beds at a high rate and work is being carried out in this direction. On the other hand it would probably be possible to run an effluent of this nature direct into a river, giving a large dilution effect and any further disposal works to be constructed might be built on these lines.

Upward Filtration. A special tank was constructed for experimental purposes to ascertain if the sedimentation tanks' effluent could be rid of part of its solid matter before reaching the filter beds. This tank worked on the upward filtration principle and had a thin layer (9 to 18 inches) of granite or sand of various sizes. To work efficiently the solids must be deposited on the under surface of the medium and thus be removed easily when necessary. The results obtained were not encouraging and the experiment was stopped after trying various sizes and depths of media and different rates of filtration.

Sludge Gas from Sedimentation Tanks. Two tanks were altered in construction to enable the sludge gas evolved to be collected. No further analyses have so far been done but the volume of gas produced daily from these tanks averaged 5,000 cubic feet. I understand that the volume of gas is increasing, and it is, at the moment, in the region of 8,000 cubic feet per day. Work is being carried out to ascertain the best method of using this energy.

HOUSE INSTALLATIONS.

Excluding Government houses, there were 89 house installations in existence, and these were regularly inspected during the year. Of these installations 31 were maintained by the Municipality, 12 belonging to Municipal houses and 19 to privately owned houses.

The number of samples of tank and filtered effluents analysed during the year was 365 and reports were made out in each case to the Municipal Sanitary Engineer, giving advice regarding efficient maintenance. With the exception of new installations, practically all of the tanks were desludged at least once during the year and some were desludged on several occasions. The desludging process consisted of running off about half of the deposited sludge only, leaving the remainder to assist the digestion of the newer sludge.

It is anticipated that all house installations will shortly be maintained and controlled by the Municipality and work has been carried on during the year to decide on the most efficient method of maintenance.

The capacity of the tanks in Singapore is based on a twelve hour retention of sewage in the tanks, the volume of liquid (sewage, bath and kitchen wastes etc.) allowed per person using the tank being 50 gallons per day. It has been found in practice that this capacity is by no means too liberal as a few tanks which have been overloaded beyond this calculated capacity give considerable trouble. It is found difficult to keep such tanks free from scum etc. which ultimately gets washed on to the beds to choke the coral and cause unpleasant odours.

This formation of scum in the large compartment of the tank has been a troublesome factor in many of the installations, particularly, of course, in those cases where digested sludge has not been periodically removed to give sufficient room for settlement of the less digested solids. The presence of large quantities of this scum always sets up troubles in the filter beds. These difficulties are being overcome to a large extent by running off digested sludge at fairly frequent intervals, the period adopted at the end of the year being approximately every four months.

An interesting experiment was put in hand towards the end of the year in which one of the existing tanks was modified in construction to imitate the action of an Imhoff tank. In the particular installation chosen there are two tanks, both of which are of the same capacity and are treating practically the same amount of sewage. As only one of these tanks has been altered, some valuable comparative results should be obtained, which may have an important bearing on the method of construction of new tanks.

During the year there have been statements made that bath and kitchen wastes need not be run into the septic tank and that the tanks could therefore be of much smaller capacity. I have proved from experiments carried out in Singapore that bath and kitchen wastes are of an objectionable character both as regards bad odour and chemical quality. In addition experience of the working of septic tanks goes to prove that the dilution of sewage with such bath wastes is essential for the efficient working of the tank.

I hope to put forward more definite suggestions regarding the maximum period between desludging etc., in my next report.

SAMPLES FROM HEALTH DEPARTMENT.

The samples examined were received from various officers of the Department and include many unofficial samples bought by the Sanitary Inspectors and by my own staff from the local shops etc. If any of these samples proved to be adulterated steps were often taken to purchase official samples with a view to prosecution. The details of the various analyses carried out during the year are as follows:—

Imported Tinned Milk—

Sweetened condensed	42
Unsweetened condensed	9
Natural	1
Artificial butter milk powder	1

Other Milks—

Cow and buffalo milk from itinerant vendors ...	183
Fresh cows' milk from retail shops	9
Reconstituted milk	55
Human milk	2

Butter	2
Tea	1
Brandy	4
Whisky	1
Beer	1
Samsoo	28
Toddy	3
Bean curds in tins and jars	6
Tinned pineapple	1
Flaked tapioca	3
Sago and wheat flours	6
Chinese and Japanese face powders	37
Soda waters from factories etc.	65
Sugar and syrup	2
Blood and urine	7
Fertiliser	1
Waters for sea water content	634
Silicic acid for bacteriological medium	1
Yeast	2
Well water	186
Chlorinated water from Mandai	6

Tinned Milks. One sweetened condensed milk had too low a dilution factor and two were found to have a lactic acid content above the usual value. The regulations at present in force in the Straits Settlements regarding condensed milks are based on a dilution factor only and they enable firms to import what is in effect a skimmed condensed milk. The sale of skimmed milk is prohibited and I am of the opinion that the public will only be safeguarded by the introduction of a minimum fat standard. I trust that such alterations will be in force in the near future.

The artificial butter milk powder, which was deficient in fat, was not put on the market.

Milks from Itinerant Vendors. The problem of the effective control of the standard of milk sold by the Bengali vendors has not yet been solved, as is shown in the following data.

Of 120 samples of milk from licensed vendors, 21 or 17.5 per cent were adulterated and of 63 samples from unlicensed vendors, 27 or 42.9 per cent were below the required standards. This points to the fact that the unlicensed men are the worse offendors. A summary of the analyses is given herewith.

ANALYSES OF MILKS BOUGHT FROM

ITINERANT VENDORS.

		Licensed Vendors.	Uulicensed Vendors.
Number of Analyses carried out		120	63
Deficiency in Non-fatty solids ...	Number	18	26
	Per Cent	15.0%	41.3%
	Range	1.2% to 42.3%	3.5% to 46.0%
	Average	12.7%	16.4%
Deficiency in Fat	Number	4	1
	Per Cent	3.3%	1.6%
	Range	4.6% to 13.9%	—
	Average	8.8%	7.7%

One sample from a licensed vendor was deficient in both non-fatty solids and fat.

Fresh Cows' Milk. A local European firm started a dairy towards the end of the year and, of the samples examined, one only was low in fat.

Reconstituted Milk. Of the 55 samples analysed, three were deficient in fat.

Liquors. Three of the four brandy samples were below the prescribed standard for esters and the whisky was below the required alcoholic strength. The vendor of the whisky was prosecuted. The samsoo contained copper in concentrations ranging from one-half to one and a half grains per gallon. The distillery was inspected and further samples taken after intensive steaming, proved satisfactory. Two toddy samples, from analyses of the alcohol, acidity and extract, appeared to be below the recognised standard.

Bean Curds. These samples were quite wholesome and free from metallic contamination. The tin containers now appear to be of much better quality and it appears that this foodstuff, largely imported from China, is now satisfactory.

Flaked tapioca. These samples were manufactured from potato-starch.

Chinese Face Powders. Serious cases of lead poisoning, particularly among Chinese girls, was finally traced to the use of certain Chinese face powders and the majority of the different powders sold, both in shops and by hawkers, were analysed. Of the 37 examined, 10 contained lead carbonate in amounts ranging from one per cent to 34 per cent. The remainder were either free or showed the presence of minute traces only of this compound. As the result of warnings and prosecutions the sale of these harmful powders in retail shops has been stopped although occasional samples from itinerant vendors are badly contaminated.

Soda Water from Factories. Samples were taken from each of the ten factories in existence in Singapore and all were found free from any harmful contamination. Several of the smaller factories appear to be run on rather primitive lines and up-to-date apparatus for cleaning the bottles is indicated.

Waters for sea water content. These samples were collected from the Sungei Whampoe area and the sea water contents were required for research connected with anti-malarial work.

Well Water. The 186 samples of well water were taken from the following places—East Coast Road, Geylang, Thomson Road, Tanglin, Siglap, Bukit Timah Road One Tree Hill, Sumbawa Road and from many other areas in and near the Town. 172 samples showed the presence of unoxidised sewage and were condemned. A sample from the Municipal bungalow at Telok Mata Ikan was doubtful in quality and, with no other source of supply available, a recommendation was made that occupants should be warned to boil the water before use.

SAMPLES FROM ENGINEERING DEPARTMENT.

Analyses were made of the following substances:—

Coal (for proximate analysis and C.V.)	47
Coke (for proximate analysis and S.)	1
Asphalt for bitumen and grading of filler	24
Granite filler for elutriation test	10
Hume pipes etc. for absorption tests	10
Sand for solubility tests	1
Boiler water	1
Methylated spirit for alcoholic strength	1
Ground water for identification	3

SAMPLES FROM ELECTRICAL DEPARTMENT.

The following samples were examined:—

Coal (for moisture, ash and C.V.)	155
Boiler water for full analysis	1

SAMPLES FROM WATER DEPARTMENT.

Coal (moisture, Ash & C.V.)	38
Sea water from Y.M.C.A. pool etc.	311
Water from Woodleigh-Kallang concrete pipe ...	58
Various waters for contamination etc.	28
"Mud" from Pulai filters	1
Sand from Pulai filters	1
"Alumino-ferric" from Pulai	1

Wax for melting point	1
River mud for reaction etc.	1

SAMPLES FROM GAS DEPARTMENT.

Spent oxide for moisture and Sulphur	23
Coal and coke for proximate analysis and Sulphur ...	4
Iron oxide for purity	2
Refined oils from coal tar	6

VARIOUS.

Samples sent in by other Department were as follows:—

C.R.E. Johore—	
Waters from pipe line	5
Building Surveyor—	
Sand for silica content	1
P.M.C.—	
Gas Works liquor for special experiments ...	1

STAFF.

The Municipal Commissioners agreed to the appointment of a Deputy Analyst and I anticipate that the new chemist will be appointed in the early part of 1931. With the exception of a few days, I was in charge throughout the year. An extra laboratory assistant was appointed at the beginning of the year. I have pleasure in recording my thanks to the laboratory assistants, Mr. Swee Lian Choo, Mr. Tan Hock Lim, Mr. Ong Beng Guan and Mr. Tan Choon Eng for their valuable co-operation in routine and research analyses.

I have the honour to be,

Sir,

Your obedient servant,

R. E. WILLGRESS,

A.R.C.S.. B.Sc., A.I.C.,

Municipal Analyst.

TABLE A.

Averages and Ranges of Monthly Analyses of Singapore and Johore Raw Waters for 1930.

Parts per 100.000	MacRitchie Reservoir		Pierce Reservoir		Pulai II Reservoir		Pulai III Catchment		Pontian Kechil Stream	
	Ranges	Average	Ranges	Average	Ranges	Average	Ranges	Average	Ranges	Average
Total solids, dried at 180°C	3.0/4.7	3.75	3.0/5.1	3.85	4.8/7.6	6.12	3.8/5.9	5.06	3.8/5.9	4.69
Organic matter ..	1.3/2.3	1.80	.8/2.4	1.64	1.4/3.8	2.32	1.0/4.0	2.05	1.1/2.3	1.70
Mineral matter ..	1.3/3.2	1.95	1.3/4.3	2.21	2.5/5.3	3.80	1.1/4.2	3.01	2.2/3.7	2.99
Free and Saline Amonia ..	Abs./.002	.001	Abs./.002	.001	.002/.036	.014	Abs./.006	.003	Abs./.007	.002
Albuminoid Ammonia ..	.002/.006	.004	.002/.005	.004	.004/.012	.008	.001/.008	.004	.001/.007	.004
Nitrites as Nitrogen ..	—	Abs.	—	Abs.	—	Abs.	—	Abs.	—	Abs.
Nitrates as Nitrogen ..	.001/.005	.001	.001/.006	.002	.003/.009	.006	.001/.008	.004	.001/.007	.002
Oxygen absorbed in 3 mins.	.006/.092	.029	.015/.080	.035	.035/.112	.075	.014/.097	.048	.009/.062	.040
Oxygen absorbed in 4 hours	.035/.144	.084	.047/.171	.108	.132/.226	.171	.067/.189	.128	.090/.169	.119
Chlorides as Chlorine ..	—	.1	—	.1	—	.1	—	.1	—	.1
Iron ..	.03/.07	.05	.03/.09	.06	.06/.80	.25	.02/.20	.07	.02/.06	.03
Reaction—P_H Value ..	7.4/7.6	7.5	7.3/7.6	7.5	7.1/7.6	7.4	7.2/7.7	7.5	7.2/7.7	7.5
Alkalinity as ($CaC0_3$) ..	.4/.8	.6	.4/.8	.6	1.0/1.8	1.3	.6/1.3	1.0	.8/1.6	1.0
Carbon dioxide ..	—	.2	.4/.5	.4	.3/3.4	1.4	.3/.6	.4	.3/.6	.3

TABLE B.

Averages and Ranges of Analyses carried out daily during 1930, of the Filtered Waters, etc., supplied to Singapore.

x Parts per 100,000	Bukit Timah Road Clear Water Tank		Woodleigh Clear Water Tank		Pulai (Johore) Clear Water Tank		Coleman Street Tap Supply		Havelock Road Tap Supply		Y. M. C. A. Swimming Pool	
	Range	Average	Range	Average	Range	Average	Range	Average	Range	Average	Range	Average
Colour in Lovibond 2 foot tintometer:—												
Yellow ..	.6/5.5	2.0	.7/5.0	1.6	.5/16.0	2.8	.8/7.0	1.4	.8/9.5	2.3	.8/8.0	1.6
Red ..	.1/2.0	.4	.1/1.6	.3	.1/5.5	.7	.1/2.5	.2	.1/2.6	.5	.1/2.5	.2
Blue ..	.1/1.0	.3	.1/1.5	.4	.1/3.0	.5	.1/.8	.2	.1/1.0	.4	.1/1.0	.3
Iron x ..	.01/.06	.02	.01/.05	.02	.01/.55	.04	.01/.09	.02	.01/.16	.03	—	—
Alkalinity (as $CaCO_3$) x ..	.1/1.5	.6	.4/2.2	1.1	.2/6.0	2.3	.7/1.1	.9	.8/2.4	1.3	—	—
Carbon dioxide x ..	.1/.4	.3	.1/.5	.3	.1/2.5	.5	.2/.4	.3	.4/.5	.4	—	—
Reaction—P_H value ..	7.3/7.8	7.4	7.3/7.8	7.4	7.4/8.0	7.5	7.4/7.8	7.6	7.4/7.7	7.5	7.4/7.9	7.6

TABLE C.

Averages and Ranges of Analyses, carried out bi-monthly during 1930, of Depth Samples in Pulai II. Impounding Reservoir (Johore).

Depths below Surface	AMMONIA				Iron		CO_2		Alkalinity as $CaCO_3$		Reaction:— PH value	
	Free and Saline		Albuminoid									
	Ranges	Average	Ranges	Average	Ranges	Average	Ranges	Average	Ranges	Average	Ranges	Average
10 feet	.001/.020	.006	.003/.012	.006	.06/.44	.13	.20/2.0	.7	1.0/1.8	1.3	7.2/7.8	7.4
20 feet	.005/.039	.014	.004/.010	.007	.10/.90	.25	.4/2.8	1.5	1.0/3.2	1.9	7.2/7.8	7.4
30 feet	.004/.027	.014	.002/.014	.007	.08/.80	.34	.4/2.8	1.1	1.0/3.4	1.9	7.1/7.7	7.4
40 feet	.005/.032	.017	.003/.014	.007	.10/1.0	.39	.5/3.0	1.3	1.3/3.3	2.0	7.1/7.6	7.4
50 feet	.004/.036	.019	.003/.016	.008	.10/1.12	.45	.5/2.8	1.4	1.3/3.6	2.0	7.1/7.6	7.4
60 feet	.003/.040	.019	.003/.018	.008	.12/1.30	.48	.5/2.8	1.4	1.3/3.8	2.1	7.1/7.6	7.3
70 feet	.004/.044	.021	.003/.020	.009	.14/1.70	.52	.4/3.1	1.5	1.3/3.4	1.9	7.1/7.5	7.3
80 feet	.006/.048	.023	.003/.020	.009	.14/1.8	.55	.4/3.3	1.5	1.4/3.8	2.1	7.1/7.5	7.3

TABLE D.

Average Monthly Value for Iron and Carbon Dioxide of the Raw and Filtered Waters at Pulai during 1930.

Parts per 100,000.	RAW WATER.		FILTERED WATER.	
	Iron.	Carbon Dioxide.	Iron.	Carbon Dioxide
January	.13	1.1	.06	.8
February	.11	.7	.04	.2
March	.13	.8	.02	.3
April	.12	1.0	.02	.3
May	.14	1.1	.02	.4
June	.14	1.2	.02	.4
July	.16	.8	.02	.3
August	.13	.4	.02	.2
September	.15	.9	.02	.5
October	.26	.8	.09	.8
November	.79	3.4	.10	.9
December	.37	2.5	.02	.5

TABLE E.

Average of Monthly Analyses, during 1930, of Singapore Tap Supply.

Parts per 100,000.	Havelock Road Tap Supply from Pearls Hill Service Reservoir.	Coleman Street Tap Supply from Fort Canning Service Reservoir.
Total solids, dried at 180°C	4.39	3.33
Organic solids	1.85	1.35
Mineral matter	2.54	1.98
Free and Saline Ammonia	.001	Absent
Albuminoid Ammonia	.003	.002
Nitrites as Nitrogen	Absent	Absent
Nitrates as Nitrogen	.003	.002
Oxygen absorbed in 3 mins.	.018	.018
Oxygen absorbed in 4 hours	.056	.048
Chlorides as chlorine	.1	.1
Iron	.04	.02
Reaction—P_H value	7.5	7.6
Alkalinity (as $CaCo_3$)	1.3	.9
Carbon dioxide	.4	.3
Colour in Lovibond 2 ft. tintometer		
Yellow	3.0	1.1
Red	.8	.1
Blue	.4	.1

TABLE F.

Average of Daily Analyses of Crude Sewage and Effluents from the Alexandra Road Sewage Works during 1930.

Parts per 100,00.	Ammonia.		Oxygen absorbed in 4 hours.	Suspended Matter.	Nitrates as Nitrogen.	Chlorides as Chlorine.
	Free.	Alb.				
Crude Sewage ...	3.90	0.90	9.93	34.4	...	82
Effluent from:—						
Detritus Tanks ...	...	...	...	29.8	...	...
Sedimentation Tanks	4.50	0.70	6.62	14.6	...	69
Filter Beds ...	1.21	0.12	1.61	3.46	0.75	106
Humus Tanks ...	1.39	0.13	1.64	2.26	0.75	86

TABLE G.

Ranges of Daily Analyses of Crude Sewage and Effluents from Alexandra Road Works during 1930.

Parts per 100,00.	Ammonia.		Oxygen absorbed in 4 hours.	Suspended Matter.	Nitrates as Nitrogen.	Chlorides as Chlorine.
	Free.	Alb.				
Crude Sewage ...	1.4/6.3	.2/2.2	4.0/16.8	16.4/68.5	...	21/465
Effluent from:—						
Detritus Tanks ...	...	...	...	14.7/54.0	...	...
Sedimentation Tanks	1.5/8.0	.2/1.6	3.4/10.9	8.5/43.0	...	39/160
Filter Beds ...	.33/2.8	.02/.36	.9/2.9	1.2/8.2	.2/2.1	36/376
Humus Tanks ..	.42/2.9	.02/.44	.8/2.9	.5/6.3	.2/2.8	35/311

TABLE H.

Average Monthly Analyses of Effluents from the 17 filter beds in Blocks "A & B" and the 21 filter beds in Blocks "C & D."

BLOCKS "A & B."

Parts per 100,000.

	Ammonia.		Oxygen absorbed in 4 hours.	Suspended Matter.	Nitrates as Nitrogen.	Chlorides as Chlorine.
	Free.	Alb.				
January ...	1.59	.10	1.22	3.21	.7	108
February ...	1.27	.11	1.42	3.05	.9	138
March ...	1.39	.13	1.74	3.60	.6	135
April ...	1.33	.13	2.03	4.50	.8	107
May ...	1.33	.15	1.55	3.00	.8	82
June ...	1.66	.19	1.55	3.20	.8	74
July ...	1.62	.17	1.96	3.00	1.0	79
August ...	1.41	.17	1.99	4.11	1.1	82
September ...	1.57	.21	2.05	4.20	1.0	64
October ...	1.62	.20	2.36	4.90	.7	66
November ...	1.95	.25	2.72	5.40	.5	68
December ...	1.34	.22	2.24	4.20	.8	57
Average ...	1.51	0.17	1.90	3.86	0.8	88

BLOCK "C & D."

	Ammonia.		Oxygen absorbed in 4 hours.	Suspended Matter.	Nitrates as Nitrogen.	Chlorides as Chlorine.
	Free.	Alb.				
January ..	.99	.09	1.27	2.99	.8	111
February ..	1.06	.09	1.48	2.94	.7	130
March ...	.65	.08	1.76	3.90	.7	132
April ...	.88	.12	1.82	3.50	.6	104
May ...	.94	.16	1.62	2.60	.7	84
June ...	1.51	.14	1.70	3.10	.4	75
July ...	1.17	.14	1.65	2.70	.8	78
August ...	1.27	.18	2.10	4.99	.6	66
September ...	1.26	.17	1.85	3.74	.6	66
October ...	1.33	.19	1.88	3.60	.6	67
November ...	1.36	.19	2.00	3.90	.5	65
December ...	1.23	.15	2.06	5.34	.5	53
Average ...	1.14	0.14	1.77	3.61	0.6	86

Singapore, 12th December, 1930.

The Municipal Health Officer,

Sir,

The following account of some of the work done this year up to the end of November, is forwarded in lieu of the 18th Annual Report of the Laboratory which I shall not be able to write this year as I am going on long leave.

MALARIA.

Four thousand one hundred and six blood films have been received, and in 921 of these malaria parasites were found. The percentage of positive findings is 22.2. There were 330 subtertian infections, 587 benign tertian, 2 quartan, and 2 mixed subtertian and benign tertian. Of the 921 positive films, 223 came from the Johore Water Works, 8 from Mandai Quarry, 340 from the Health Department and 350 from Practitioners. Five years ago, when I was writing a report similar to this, the total number of blood films received, up to the time of the report, was 928, of which 300 were positive. This year the positive finding practically equal the total films of 1925. The greatest increase comes from practitioners, who have sent nearly five times as many positive films as they did in 1925. Next to them comes the Health Department who have nearly four times as many as five years ago. On the other hand Mandai Quarry has only a fifth of the number sent in 1925. The percentage positive was 60% from the Johore Water Works, 42% from Mandai Quarry, 16% from the Health Department and 21% from Practitioners. One hundred and twenty films were taken from school children at Geylang suffering from fever and in 31, or nearly 25%, Malaria parasites were found. Seven were subtertian infections, 23 benign tertian, and one quartan.

TUBERCULOSIS.

The specimens of human origin call for no comment and will be summarised in the annual report.

The laboratory and abattoir staffs have worked in close co-operation during the year, and this has resulted in some information being gained about tuberculosis in animals brought for slaughter. It has often been said that tuberculosis in cattle is rare in Malaya while in pigs it is almost unknown. One speaker at the Royal Society of Tropical Medicine and Hygiene in London on 11th May 1929 said that " he had no record of any (i.e. tuberculosis) on 250,000 pigs examined under his supervision at the Ipoh abattoir during six years. He knew no veterinary surgeon who had seen the disease in cattle in Malaya. The only records he could find, apart from Kenya, which lay very high, were in French possessions. In Dakar there was a herd with tubercle: in the south of Madagascar the Boras took milk largely from heavily infected cattle, but remained without infection. There was said to be bovine tubercle in adult cattle, but not in calves, in South Annam. In the Belgian Congo there was much. In thirteen British Colonies and dependencies in the tropics there was none reported apart from Kenya." (1).

In my report last year I mentioned that 12 specimens of glands were received in 7 of which bacilli morphologically indistinguishable from the tubercle bacillus were found. Up to the end of November this year 325 specimens of pigs glands, 5 of lungs, 1 of liver, 1 of spleen and 2 of peritoneum have been examined and in 83 of the glands and 3 of the portions of lungs the tubercle bacillus has been found. A case of generalized tuberculosis of the pig was found also at the abattoir and this is illustrated in fig. 1 where tubercular nodules can be seen in the spleen, in the parietal pleura, and in the submaxillary gland. The glands examined shewed all the different stages of tuberculosis of lymph glands. Many were much enlarged, the gland substance changed into a pinkish grey tissue with fibrous branches running through it, others a mere shell, full of creamy "pus," others caseous, and many transformed into yellow masses more or less calcified and gritty. A very common type is slightly enlarged with numerous calcareous small masses which can be shelled out from a thickened capsule in the substance of the gland. It was found very difficult to produce experimental tuberculosis in guinea pigs with these glands. Thirteen guinea pigs were inoculated subcutaneously with gland material but in no instance did a generalized tuberculosis result. Indeed all the guinea pigs appeared to be perfectly healthy and put on weight. In only two were any lesions found at all and these were very small viz. one enlarged inguinal gland in the one case, and two small subcutaneous nodules in the other, but in both cases the bacillus was present in the lesions. This low degree of infectivity and virulence for the guinea pig, which of course is an animal very susceptible to both human and bovine tuberculosis, points to the lesions in these pigs being caused by the avian tubercle bacillus. This form of tubercle is responsible for 30 per cent of cases of tuberculosis of swine in England (2) and the question is at once raised as to how common this type of tubercle is in Singapore. Of the 84 swine, in whose glands or organs tubercle bacilli were found by the microscope, 43 came from Singapore, 31 from Bali, and 10 from Saigon. The lung lesions in swine here present a contrast to those in the glands. Material from the lung of a pig, sent from the abattoir at Jalan Besar, in which tubercle bacilli were present was inoculated into a guinea pig on 25th May. The inguinal glands rapidly enlarged, and the animal became obviously ill. On 19th June it was killed and the inguinal glands were found to be caseous, and breaking down in places while the spleen was full of tubercles. The tubercle bacillus was recovered in pure culture from the glands and proved to be of the human type. In the case of pigs then it is demonstrated that tuberculosis does exist in Singapore though the evidence tends to shew that most of this tuberculosis may be of the avian type.

With regard to cattle the position is different as regards Singapore. Very few local cattle are brought for slaughter, most of the cattle coming from Siam. Six specimens of glands, 5 of lungs, 4 of livers and 1 of spleen were received, and tubercle bacilli were found in 4 of the glands, in all the lungs and in 2 of the livers. This was confirmed in some cases by inoculation and culture. A guinea pig received 1 cc. sediment from a bullock's gland on 7th January. The inguinal glands enlarged and when the pig was killed on 13th March the inguinal gland was broken down, and converted into a creamy yellow material, in which numerous tubercle bacilli were found. The pig was otherwise healthy. Cultures made on the usual media, for isolating tubercle bacilli, gave no growth. This result is in favour of the bacillus being of the bovine type, which is dysgonic i.e. difficult to grow on artificial media. Some of the material from this gland was inoculated intraperitoneally into a rabbit, which in two months developed generalized tuberculosis. The lungs of this rabbit are shewn in Fig. (II). A similar experiment was done with the glands of another Siamese ox on 5th February. Two months after inoculation the guinea pig had an enlarged gland in which tubercle bacilli were found, and this on subcutaneous inoculation into a rabbit, produced an enormous tubercular deposit at the point of inoculation in 8 weeks. The lungs sent from the abattoir all presented gross tubercular lesions, one of which is shewn in Fig. (III). Of the nine cattle in which the tubercle bacillus was demonstrated, eight came from Siam and one from Saigon. In addition to these nine, there were one hundred and eleven cattle slaughtered in which tubercular lesions were so obvious as to need no laboratory investigation. Altogether there were seventy four cattle from Siam, twenty five from Saigon, two from Patani, and nineteen from Singapore in which obvious gross tubercular lesions were present including several cases in which the disease was generalized. The local cattle were mostly working Indian Bullocks. It is therefore apparent that tuberculosis of cattle and pigs and birds exists in Singapore, and the importance of proper meat inspection is evident.

PLAGUE.

No case of plague has occurred this year in Singapore up to date.

Rats.—Three thousand, nine hundred and fifty eight rats were examined in the laboratory but none were found infected with Plague. These rats were received part from the Port Health Office and part from our own rat catcher. The species and distribution are tabulated below.

SOURCE	Decumanus		Rattus		Concolor		Musculus		Crocidura	Total
	M	F	M	F	M	F	M	F		
Ports & Ships ..	23	23	164	248	4	1	—	—	1	464
Town	1,187	1,855	36	28	53	82	7	1	245	3,494
	1,210	1,878	200	276	57	83	7	1	246	3,958
Total ..	3,088		476		140		8		246	3,958

A striking feature is the difference in the proportion of rattus to decamanus in the Port and Shipping Area, compared with that in the town. There is only one decumanus to ten rattus in the S.H.B. godowns, and on board the ships, while in the town, there are almost fifty decumanus to one rattus.

This proportion in the town appears to have increased of recent years, as is seen in the following table.

YEAR	Total rats	Ratio of decumanus to rattus	Plague Cases
1918	4,152	5 to 1	176
1919	945	4 to 1	11
1920	104	1 to 1	61
1921	....	....	28
1922	53	Not observed	38
1923	510	8 to 1	52
1924	1,218	5 to 1	20
1925	4,217	15 to 1	59
1926	5,241	10 to 1	7
1927	4,137	10 to 1	4
1928	398	Not observed	5
1929	130	Not observed	3
1930	3,958	50 to 1	0

It would seem that decumanus is forcing rattus out of the town area, but it may be that if trapping were conducted on the upper floors of houses that a greater number of rattus would be caught, and the proportions of the two species would more nearly approach that in the Harbour Board Area. There appear to be difficulties in setting traps in the upper floors. In the Harbour Board Godowns there is no question of upper floors however.

The rattus caught in the town are nearly all of the one type as regards colour, but on the ships there is a much greater variety, and instead of the uniformly grey bellied rat, varieties with white bellies are found and some are almost completely black.

Fleas.—Five thousand, six hundred and seventy one fleas were caught an average of nearly 1.5 fleas per rat or 150 per hundred rats. The average for port rats was 2.2 and for town rats 1.3. No identification of fleas was made after March, as it was evident that X. Cheopis was the rat flea of Singapore.

The following table gives the flea index since 1923.

YEAR	All rats	R. decumanus	R. rattus	Town	Port
1923 ..	3.7	3.5	6.5	—	—
1924 ..	2.9	2.7	5.6	—	—
1925 ..	3.1	3.1	4.3	—	—
1926 ..	2.7	2.7	4.8	—	—
1927 ..	—	—	—	—	—
1928 ..	—	—	—	—	—
1929 ..	2.2	—	—	0.8	2.7
1930 ..	1.5	—	—	1.3	2.2

The flea index for rats in Singapore is therefore very low, either because the climate does not suit the rat flea, or, because the flea becomes an easy prey to natural enemies. Any one who keeps dogs, or cats, here knows how easily they become infested with fleas, so that the climate does not seem to hinder fleas breeding on these animals. The human flea too breeds vigorously, and on more than one occasion the Health Office has had to deal with outbreaks of human fleas in godowns and houses. I am inclined to think that we owe our low rat flea index to ants, which seize, and carry away the eggs and pupae of the flea, as they do those of flies in the Philippines and here too for that matter. When out with the rat catcher, and observing rat runs, I have frequently noticed large numbers of ants busily engaged going backwards and forwards. The matter could be tested fairly easily but the long and patient observations necessary are very liable to interruption in a public laboratory or hospital.

Resistance of local rats to Plague and Virulence of local strains of B. pestis.—The possibility of an epidemic or epizootic will depend among other things, partly upon the power of infectivity and the virulence of the organism, and partly on the susceptibility of the host.

Experience in the laboratory has shewn that strains of plague bacilli isolated in Singapore, and elsewhere in Malaya, are very apt to decrease in virulence. Six strains were sent to Australia two years ago and were found to be of low virulence for rats. and even deficient in infective power, as in most cases "few or no bacilli were seen" and cultures were often negative. Even when infection took place, the appearances were often atypical. These strains were isolated from fatal cases of plague in Singapore, Batu Gajah and Ipoh, from a recovered case in Singapore, and in two cases from Singapore rats. They were identical morphologically and gave the same reactions in different media including 21 carbohydrates, and all produced nitrites in peptone water, and failed to produce indol.

Strain No. 3/28 isolated from a fatal case on March 1928 was inoculated into 2 R. decumanus in March 1930 by pricking with an infected needle. Both rats were alive and well five days later and were killed. All the tissues were normal and cultures from glands and heart blood were sterile. The culture was tested by rubbing on the shaven abdomen of a guinea pig, a classical test for virulent B. pestis, but the pig remained perfectly healthy. On injecting 1/4 of an agar slope of this culture with another guinea pig death occurred in 5 days, and the strain was recovered (3/28a). This strain killed a rat in 4 days but the post mortem appearances were atypical and not suggestive of acute plague. The culture was recovered from the heart blood (3/28b) and inoculated into 2 R. decumanus, which were alive and well after 7 days, and presented no pathological signs on being killed. Only 1 out of 5 rats then shewed anything like rat plague and then only when the bacillus was fresh from passage through a guinea pig. The virulence was not retained in a second passage through the rat. Either the strain rapidly loses virulence or the local rats are able to modify the virulence very considerably and therefore possess a fair amount of immunity. Another strain, 12/28, isolated from a fatal case in March 1928, killed a R. decumanus in 5 days with typical lesions, and the bacilli from this rat killed another R. decumanus in 6 days, but the culture was not recovered, and the post mortem appearances were not typical. Some modification of virulence took place here. In both these rats the "drunken" or wandering and staggering stage was easily observed and came on about the 3rd day. A fresh experiment with this strain caused death in 7 days. Two strains of B. pestis were obtained from the Pasteur Institute Bandoeng for comparison. These strains, "Bandoeng" and "Preanger" were slightly different from the local one. They grew more freely on both solid and liquid media and had less action on carbohydrates. "Bandoeng" fermented inulin. The first experiments done with these strains failed for both rats were alive and well 8 days after inoculations. Another experiment resulted in both rats being infected, the "Preanger" strain producing the classical picture of rat plague, while the "Bandoeng" one was very atypical. The spleen of the rat infected with the Bandoeng strain failed to kill a rat in 8 days and a healing plague lesion was found at the site of injection, while the spleen infected with the "Preanger" strain caused death in 4 days with typical lesions. Further experiment proved that the "Bandoeng" strain was much less virulent than the "Preanger" and this was confirmed at the College of Medicine when the strains were sent for teaching purposes.

These experiments are tabulated below and it will be seen that in about 50% of cases only were definite plague lesion produced or cultures recovered. In the case of Java strains lesions were produced in 8 out of 10 cases. With Singapore strain lesions were produced in 4 out of 11 cases and in these cases large inoculations were made having no resemblance at all the amounts injected by a plague flea. It will be noted too that passage through a rat tended to weaken the Singapore strains and the Bandoeng strain whereas the Preanger strain retained its virulence.

It would appear then that in Singapore we have strains of plague that vary in virulence and are very susceptible to passage through rats. (R. decumanus).

Strain	Animal	METHOD	Death	Killed	Result	Culture
3/28 ..	R.16	Stab	—	† 5 days	—	—
3/28 ..	R.17	Stab	—	† 5 ,,	—	—
3/28 ..	G.P.20	Rubbed on shaven skin ..	—	† 4 ,,	—	—
3/28 ..	G.P.22	1/4 slope subcutaneous ..	5	—	+	+ 3/28A
3/28A ..	R.27	0.5 cc. bouillion	4	—	+	+
3/28A ..	R.28	0.5 cc. bouillion	—	† 8 ,,	—	—
3/28A ..	R.29	0.2 cc. bouillion	—	† 8 ,,	—	—
12/28 ..	R.33	1 loop agar culture ..	5	—	+	+
12/28 ..	R.34	1 loop peritoneal fluid R/33	6	—	—	—
12/28 ..	R.39	1 loop blood culture ..	7	—	+	+
3/28 ..	R.38	1 loop blood culture ..	9*	—	—	—
Bandoeng ..	R.44	0.1 c.c. subcutaneous ..	—	† 8 ,,	—	—
Preanger ..	R.45	0.1 c.c. subcutaneous ..	—	† 8 ,,	—	—
Bandoeng ..	R.57	0.1 c.c. subcutaneous ..	—	† 4 ,,	+	+
Preanger ..	R.58	0.1 c.c. subcutaneous ..	—	† 4 ,,	++	+
Spleen 57 ..	R.60	0.1 c.c. subcutaneous ..	—	† 8 ,,	Healing lesion	—
Spleen 58 ..	R.61	0.1 c.c. subcutaneous ..	4	—	+	—
Bandoeng ..	R.63	0.5 c.c. subcutaneous ..	3	—	+	+
Preanger ..	R.64	0.5 c.c. subcutaneous ..	3	—	+	+
Spleen 64 ..	R.65	0.5 c.c. subcutaneous ..	2	—	+	+
Spleen 63 ..	R.66	0.5 c.c. subcutaneous ..	6	—	Neckotic Mass.	—

R. = R. decumanus.

† = More than.

G.P. = Guinea pig.

* = Did not die from plague. no lesions.

DIPHTHERIA.

There have been fewer cases of this disease admitted to the Middleton Hospital than last year and the cases have not been so severe. Continuing the practice started in December last year the inspecting officers have taken a swab from the throat of every child dying under ten years of age and whose death is uncertified by a practitioner in attendance. In this way 981 swabs have been obtained and in 41 of them the Klebs Loeffler bacillus has been found in culture. The percentage of positive swabs is therefore nearly 4.2 a very high percentage. Most of these children were said to have died from convulsions and indeed convulsions are a frequent terminal event in diphtheria.

The occurrence of cases of diphtheria in a school led to 49 children being swabbed and 2 carriers were found, a percentage of 4.1, almost the percentage among children dead under 10 years. The isolation in pure culture of the bacillus from these swabs was almost impossible as the specific bacilli were so quickly overgrown by saprophytes and cocci, so that virulence tests could not be undertaken, and I do not think virulence tests with a mixed culture justifiable.

WATER.

Routine analysis of Municipal Water taken at different points of the system number 9,257 and were uniformly satisfactory. They will be summarised at the end of the year.

The appearance of nitrites in the Woodleigh water occurred again during the year. During November careful watch was kept and it was found that there was really very little difference between a filter shewing nitrites and one without them. Filter No. 1 at Woodleigh had a trace of nitrites on 8 out of 10 occasions while filter 5 had a trace on 3 out of 10 occasions. The filtrate from No. 1 had lactose fermenters on 100 c.c.s. in 50 per cent of the samples while the filtrate from No. 5 had them in 20 per cent. In no case were faecal bacilli so numerous as to raise suspicion of sewage contamination. The total number of colonies was 95 in No. 1 and 75 in No. 5. It was thought that a water containing nitrites might be more " susceptible " to bacterial contamination than a water without nitrite so some experiments were made by adding either a faecal emulsion or a suspension of faecal organisms (B. coli) in water, to filtrate with and without nitrites. The results proved that there was really no difference and that increase depended on the amount of faecal material added and not on the organisms.

The examination of the chlorinated water from Mandai was discontinued in April, as the water supply there is now obtained from the Johore Pipe Line.

Water from Seletar Reservoir was supplied to Seletar Village during the year. This reservoir is known to be subject to intermittent contamination, so the water is chlorinated before delivery. The results have been very satisfactory, a water of very great bacteriological purity being supplied consistently since chlorination was adopted.

Very little work was done on the types of B. coli present in water and that mostly on samples from wells and sources other than the Municipal Supply.

The supply at Gunong Pulai gave a great deal of trouble owing to the high iron content of the water and several samples were examined for the presence of Iron Bacteria. None were found. Iron bacteria do not depend entirely on the presence of iron for their growth but require a great amount of organic material in the water as well. The only material from which I have succeeded in growing cultures, and then very impure cultures, has been sewage sludge, and by allowing suspensions of this to stand in water in shallow pans, I have succeeded in obtaining a growth like Gallionella. I have never succeeded with Singapore water or Johore water. The bacteria are there undoubtedly but conditions do not permit of their multiplication. Samples of the " mud balls " which form in the filters at Gunong Pulai were examined and yielded numerous colonies of an antinomyces. This organism blackened iron media and had a peculiar and distinct earthy odour which the engineers said was like that in the filter house, but it did not require iron for development and grew freely without it.

MORTUARY.

The only interesting case was one of Melioidosis which was sent to the Middleton Hospital as a case of Plague. This is a rare disease in Singapore and there has been only one case hitherto. The causal organism B. whitmori was isolated in pure culture.

I have the honour to be,

Sir,

Your obedient servant,

COLIN C. B. GILMOUR,
M.A., M.B., Ch.B.,
Municipal Bacteriologist.

(1) Transaction Royal Society Tropical Medicine and Hygiene XXII. No. 1, p. 87.

(2) A system of Bacteriology Medical Research Council 1930, Volume V. p. 203.

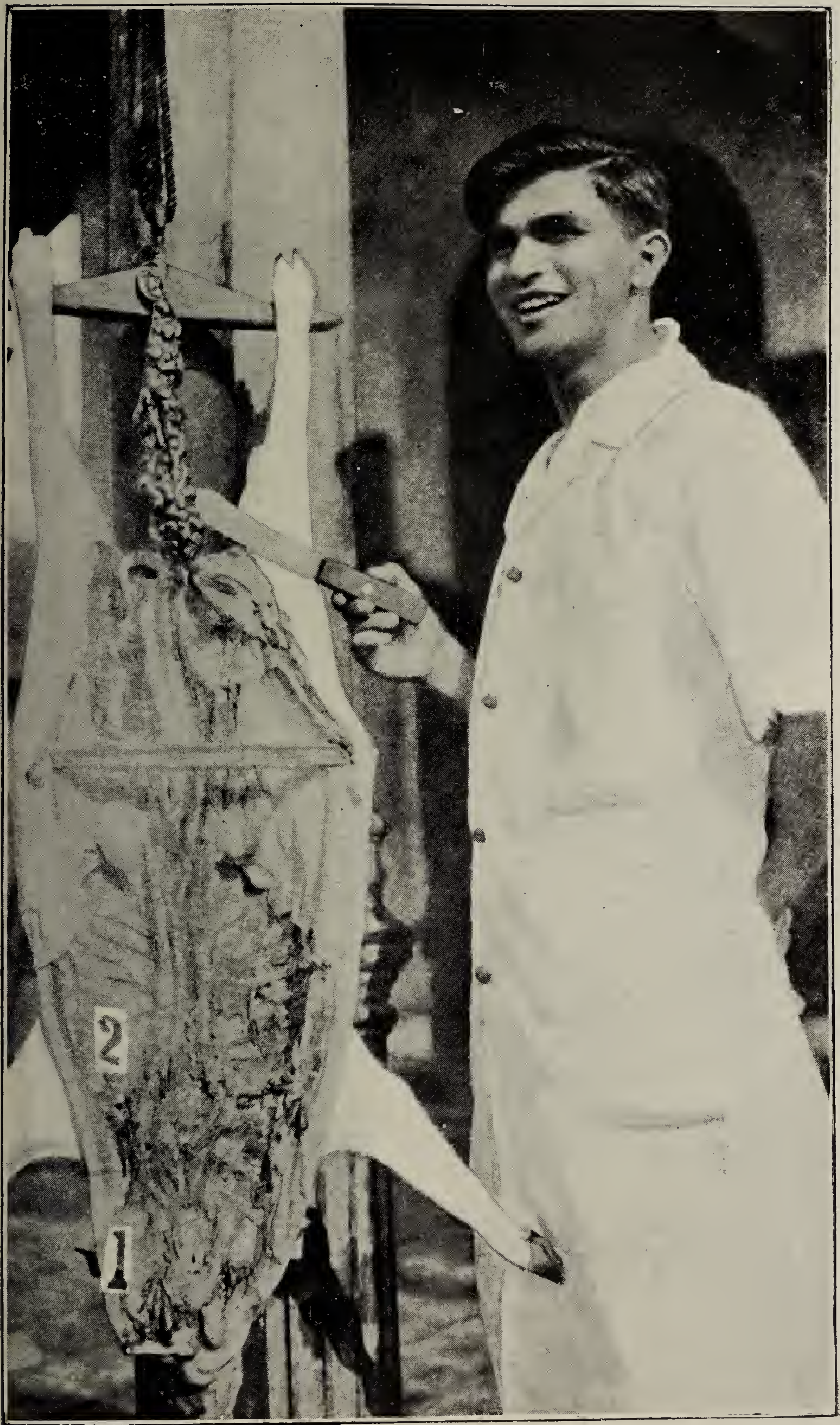

Fig. I.

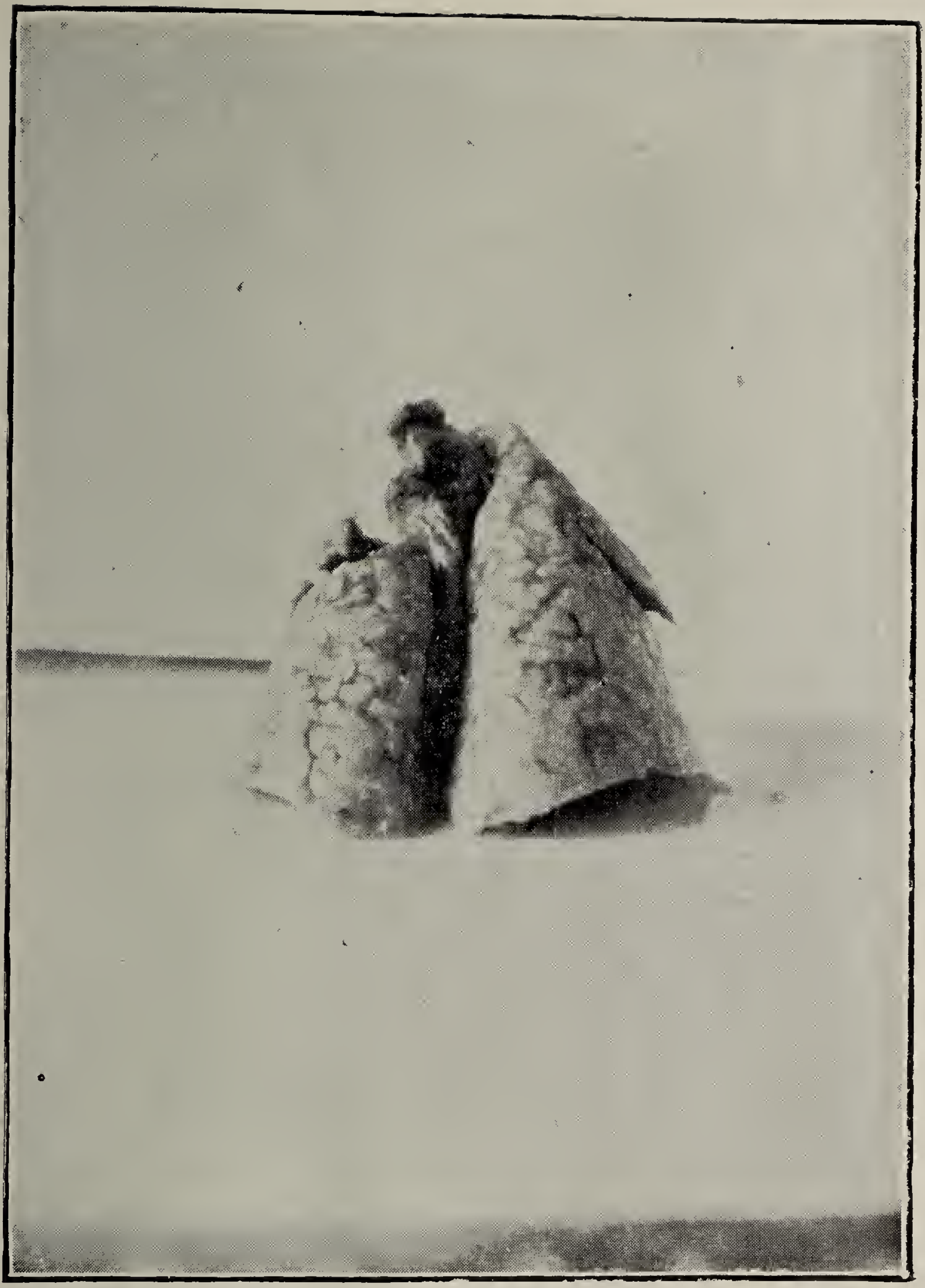

Fig. II.—Tubercles in lungs of a rabbit two months after inoculation with tubercular gland of a guinea pig infected by gland of a Siamese ox. 2-3-30.

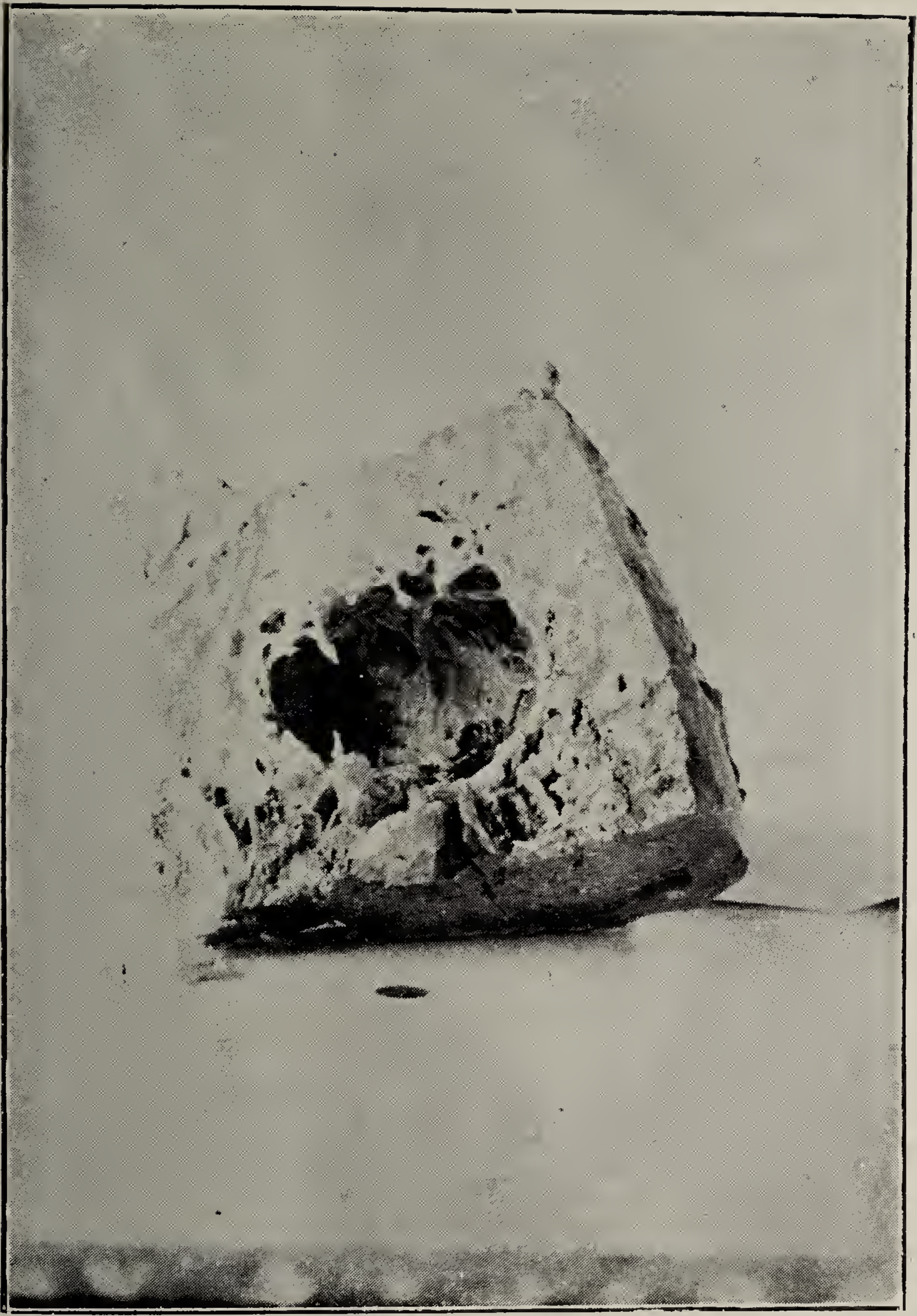

Fig. III.—Tuberculosis of lung in a cow Pulau Saigon, 1930.

Singapore Municipality

Eighteenth Annual Report

of the

Municipal Bacteriological Laboratory

For the Year

1930

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by

COLIN C. B. GILMOUR, M.A., M.B., Ch.B.

Bacteriological Laboratory,

Singapore, 10th January, 1931.

The Municipal Health Officer,

Singapore.

Sir,

I have the honour to report on the work of this department during the year 1930.

I. PUBLIC HEALTH EXAMINATIONS.

During the year a total of 21,854 examinations were carried out, against 11,105 last year.

MALARIA.

4,539 blood films were received and in 1,049 malaria parasites were found. The percentage positive was 23.1%. There were 387 subtertian infections, 658 benign tertian, 2 quartan, and 2 mixed benign and subtertian. Of the positive films 247 came from the Johore Water Works, 11 from Mandai Quarry, 387 from the Health Department and 404 from Practitioners.

TUBERCULOSIS.

Human Specimens:—646 specimens of Sputum, 3 of faeces, 1 of urine, 4 of pus, 6 of cerebro-spinal fluid, 3 of dried sputum, and 3 of dust, were examined. The dried sputum and dust were collected from coolie houses. The tubercle bacillus was demonstrated in 177 specimens of sputum and in 1 of pus.

Animal Specimens. (Pig). 338 specimens of glands, 5 of lungs, 1 of liver, 1 of spleen, and 2 of peritoneum were examined, and in 86 of the glands, and 3 of the lungs the tubercle bacillus was found.

(Bullock). 6 specimens of glands, 5 of lungs, 4 of livers and 1 of spleen were received, and the tubercle bacillus was found in 4 of the glands, in all the lungs, and in 2 of the livers.

(Goat). A specimen of lung was examined with negative result.

TYPHOID AND PARATYPHOID FEVERS.

562 agglutination tests were made. 23 specimens of serum gave a positive reaction with the B. typhosus, 3 with the B. paratyphosus A., and 4 with the B. paratyphosus B. 28 specimens of faeces, 4 of urine, and 15 of blood were examined, and from 3 of the faeces, and 1 of the urine, the B. typhosus was isolated in culture.

DYSENTERY.

Amoebic:—834 specimens were examined, in 92 of which amoebae or amoebic cysts were found. These were classified as E. histolytica or its cysts 46, E. coli or its cysts 45, and 1 Iodamoeba.

Bacillary:—204 specimens were examined. The B. Dysenteriae of Hiss and Russell was isolated in culture from 5 of them.

CHOLERA.

7 specimens were examined with negative results.

PLAGUE.

During the year one specimen of human origin was examined with negative result.

Rats. 4,290 rats were dissected, and were all free from plague. 502 rats came from the Port Area and ships at the wharves through the Port Health Officer. The remainder were trapped in town.

The species and distribution were as follows:—

SOURCE	Decumanus		Rattus		Concolor		Mus-culus	Croci-dura
	Male	Female	Male	Female	Male	Female		
Port & Ships	23	23	174	276	4	1	—	1
Town ..	1,280	2,003	37	33	58	90	8	279
	1,303	2,026	211	309	62	91	8	280
Total ..	3,329		520		153		8	280

Fleas:—5,965 rat fleas were caught, an average of 1.4 per rat. The average for Port rats was 2.2 and for Town rats 1.3.

CEREBRO-SPINAL FEVER.

54 specimens of cerebro-spinal fluid were received, and in 27 of these the meningococcus was demonstrated.

DIPHTHERIA.

1,869 specimens of swabs were examined and from 167 of these the Klebs-Loeffler bacillus was isolated in culture. The inspecting officers of deaths sent in 1,060 swabs with 44 positive results and the Japanese Society School 95 with 2 positive results.

LEPROSY.

57 specimens were examined, and in 30 of these the Bacillus leprae was demonstrated.

MISCELLANEOUS EXAMINATIONS.

83	specimens of	Urine for General Examination.
33	,,	Urine for Causative Organisms.
42	,,	Pus for Causative Organisms.
7	,,	Pathological Fluid for Causative Organisms.
270	,,	Pus for Gonococci (90 + ve).
6	,,	Urine for Gonococci (— ve).
9	,,	Prostatic Fluid for Gonococci (1 + ve).
1814	,,	Faeces for Intestinal parasites (*).
2	,,	Faeces (dog) for Intestinal parasites (2 Ankylostome).
1	,,	Faeces (Bullock) for Intestinal parasites (— ve).
1	,,	Faeces for Food Poisoning (— ve).
1	,,	Sputum for Pneumococci (+ ve).
1	,,	Cerebro-spinal Fluid for Pneumococci (+ ve).
8	,,	Blood (Bullock) for Parasites (— ve).
3	,,	Blood (Pig) for Swine fever (1 + ve).
3	,,	Kidney Fat (Pig) for Sclerostomes (3 + ve).
2	,,	Kidney for Leptospira (— ve).
4	,,	Liver for Leptospira (— ve).
1	,,	Spleen for Leptospira (— ve).
1	,,	Meat Juice for Fungi (— ve).
8	,,	Serum for T. Pallida (1 + ve).
3	,,	Semen for Spermatozoa (3 + ve).
3	,,	Blood for Weil Felix Reaction (— ve).
1	,,	Blood for Haemoglobin Index.
5	,,	Blood for Differential Count.
3	,,	Butter.
4	,,	Milk Powder.
66	,,	Milk.
1	,,	Flour.
5	,,	Tumour.
1	,,	Worm Killer.
1	,,	Guinea-pig for Gas-poisoning.
2	,,	Soda Water.

(*) (99 Ankylostome, 20 Strongyloides, 350 Ascaris, 259 Trichuris and 37 Lamblia Cysts).

II. WATER.

10,054 samples of water were analysed during the year, and the results were uniformly satisfactory. As in previous years the examinations carried out were (a) An estimation of the total number of colonies per c.c. growing on Agar at 37°C. (b) An estimation of the smallest quantity of the sample in which lactose fermenters were present.

The following table summarises the results obtained under (a) and (b) from the chief-points in the system during the year.

SOURCE	Total Counts	Lactose Fermenters present in					
		—100	+100	+10	+ 1	+0.1	+0.01
Sultan Ibrahim V.T. ..	202	10.2	89.8	31.0	5.8	—	—
Sultan Ibrahim C.W.T. ..	48	75.0	25.0	3.0	—	—	—
Seletar Reservoir V.T. ..	502	3.8	96.2	62.7	18.2	1.7	0.4
Pierce Reservoir V.T. ..	93	6.4	93.6	47.0	3.8	—	—
Mac.Ritchie Reser. V.T.	71	14.5	85.5	60.7	12.0	—	—
Bukit Timah Raw Water	168	13.6	86.4	55.5	15.2	0.4	—
Woodleigh Raw Water	179	23.3	76.7	23.3	3.4	0.4	—
Pearls Hill I. ..	76	44.9	55.1	15.3	1.3	—	—
Pearls Hill II. ..	82	46.6	53.4	12.4	1.7	—	—
Fort Canning Reservoir	84	71.6	28.4	2.5	0.4	—	—
Tap ..	80	71.6	28.4	0.4	—	—	—

In addition to the above routine samples the following samples were analysed during the year, and the results were reported to the various people concerned at the time.

Mandai Quarry	5
Hammer & Co., Ltd.	22
Municipal Bungalow "Telok Mata Ikan"	1
Fraser & Neave	2
St. John's Island	1
Singapore Cold Storage	1
Ladyhill	1
Mr. L. L. Williams	1
Thye Lee Kongsie	1

III. SEWAGE.

45 samples of Chlorinated effluent from the Middleton Hospital, and 111 samples of wash water from the Conservancy Department were examined during the year.

IV. MORTUARY.

5 post mortem examinations were made during the year.

The causes of death were:—

Gastro Enteritis	1
Diphtheria	1
Beri-Beri	1
Adenitis and Septicaemia	1
Melioidosis	1

I have the honour to be,

Sir,

Your obedient servant,

P. S. HUNTER,
M.A., M.B., Ch.B., D.P.H.
for Municipal Bacteriologist.

Middleton Hospital,
Singapore,
23rd January, 1931.

The Municipal Health Officer,
Singapore.

Sir,

I have the honour to present the annual report of the Middleton Hospital for the year 1930.

The following table summaries the cases treated during the year.

Return of cases under Treatment during the year 1930.

Disease.	Remaining from 1929	Admitted.	Discharged.	Died.	Remaining End 1930.
Smallpox	..	..	..	..	..
Cholera	..	..	..	..	..
Plague	..	..	..	..	..
Chickenpox	7	334	331	..	10
Measles	3	60	60	3	..
Diphtheria	1	35	28	7	1
Cerebro-Spinal Fever ..	..	17	2	15	..
Erysipelas	..	7	7	..	..
Whooping Cough	..	14	14	..	..
Mumps	3	10	13	..	..
Under Observation and Contacts ..	1	48	49	..	..
German Measles	..	5	5	..	..
Typhoid	..	1	1	..	..
Puerperal fever	..	1	1	..	..
Tuberculosis	..	1	1	..	..
Other Diseases	..	44	36	8	..
Total ..	15	577	548	33	11

At the end of 1929 there were 15 patients in Hospital viz:—

7 Chickenpox, 3 Measles, 1 Diphtheria, 3 Mumps, 1 under observation.

During the year 1930 there were 577 admissions of which 33 died.

I. Diphtheria—35 cases were admitted and one remained from last year—total 36. Of these, 7 died, 1 remained in Hospital at the end of the year and the rest recovered. Ten cases were laryngeal of whom six required tracheotomy.

II. Cerebro-Spinal Fever—17 cases were admitted of whom 15 died.

III. Chickenpox—334 cases were admitted of whom 213 were adult Tamils nearly all our own coolies.

IV. Measles—60 cases were admitted of whom 3 died.

V. Other Diseaases—44 patients, admitted as having one or other notifiable infectious diseases, were found to have other diseases. Eight of them died. The causes of death being Syphilis 1, Pneumococcal Meningitis 2, Jaundice 1, Subtertian Malaria, 1, Cellulitis 1, Tubercular Meningitis 1 and Melioidosis 1. The remainder were discharged or transferred to other Hospitals.

The Nationalities treated were:—

Europeans	13	210 days.
Eurasians	31	562 „
Japanese	6	84 „
Chinese	182	2,523 „
Malays	19	232 „
Indians	326	4,396 „
Total ...	577	8,007 days.

At the end of 1929 there remained in Hospital 9 Indians, 1 Malay and 5 Chinese who spent 116 days. The total number of days spent in Hospital was (8,007 + 116) 8,123.

I have the honour to be,

Sir,

Your obedient servant,

A. THURAI,

The following Table shows the admissions to Middleton Hospital during the past ten years.

Diseases.	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
Cholera	..	..	..	..	..	16	20	4	..	..
Small Pox	139	248	2	8	9	30	16	8	9	..
Plague	16	20	29	11	21	1	2	3	..	..
Chickenpox	98	103	172	210	277	155	180	324	553	334
Diphtheria	20	13	18	17	32	25	16	42	38	35
Cerebro Spinal Fever ..	57	29	6	13	7	6	14	13	3	17
Influenza	5	1	..	..	..	..	..	..	..	..
Measles	39	23	20	29	49	70	69	94	42	60
Erysipelas	9	3	8	5	2	11	3	6	1	7
Mumps	25	..	6	..	27	47	79	48	66	10
Whooping Cough	1	..	1	..	1	6	4	8	1	14
Typhoid Fever	1	..	1	..	1	3	1	..	..	1
Pulmonary Tuberculosis ..	5	4	2	..	1	1	..	1	1	1
German Measles	..	1	..	21	7	3	18	7	6	5
Scarlet Fever	..	1	..	..	..	1	..	3	6	..
Contacts	..	..	..	..	19	18	42	45	17	48
Typhus Fever	..	..	..	..	..	..	..	1	..	..
Puerperal Fever	..	..	..	..	..	..	1	..	..	1
Other Diseases	61	58	15	41	17	32	52	63	63	44
Total ..	476	504	282	361	473	425	517	670	806	577

Municipal Health Department,

Singapore.

9th March, 1931.

The Municipal Health Officer,

Singapore.

Sir,

I have the honour to submit my 11th Annual Report in connection with the supervision of the Municipal Markets the inspection of foodstuffs sold in them and in the shop within Municipal confines.

MUNICIPAL MARKETS.

We have now eleven such markets in various parts of the town as follows·

Clyde Terrace Market in Beach Road which is the largest market from the business point of view. More than half of the 12,000 tons of fish sold in the markets passes through here.

Ellenborough Market in North Boat Quay which supplies China Town.

Telok Ayer Market facing Robinson Road which is the centre of the ship chandlery business.

Kandang Kerbau Market in the Tekka which is a very flourishing retail market.

Orchard Road Market near the Cold Storage Depôt which might be termed the European market as the numbers of Mems who purchase there seems to grow daily.

Peoples Park Market which is in the heart of China Town and supplies the needs of the daily paid members of the Chinese coolie class.

Maxwell Market at junction of Maxwell and South Bridge Road is a new type of market designed to take the place of People's Park if and when that place is put to another use.

Grange Road Market a small market (originally the Dried goods shed of Clyde Terrace Market) situated below the Barracks in Grange Road is but yet in its infancy.

On the other side of the Town we have the Geylang Market at the 3rd milestone and Joo Chiat Market in Joo Chiat Lane. A modern market was opened in September at Sims Avenue and will eventually displace the badly designed Geylang Shelter.

In addition to the foregoing there are several authorised private markets and many unauthorised pitches which constitute open-air markets as they are the rendezvous of produce sellers and would appear to satisfy a demand for easily accessible buying, thus saving transport charges to those of the public to whom every cent counts.

CLEANSING AND SUPERVISION.

The staff to deal with the Municipal Markets is as follows:—

9 Market Keepers.

2 Chinese Mandors.

85 Tamil Coolies.

In addition 12 night watchmen are employed and a revenue staff for dealing with the collection of rents etc.

Each stall is dismantled once a month and thoroughly cleansed. With the new type of stalls which are being adopted this work will be simplified. At Chinese New Year all the markets are vacated and thoroughly cleansed from roof to floor. It is significant that the vermin caught during this process can now be counted on one's fingers whereas formerly hundreds were taken in each market while many more escaped.

REPAIRS.

These are carried out more expeditiously now that a system whereby all Markets are taken in turn and any big work is specially provided for in budget.

The following repairs were carried out during the year.

Clyde Terrace. The old downspouts from the central guttering were renewed and empty into covered surface drains, much simplifying cleansing.

The whole of the sea side of the market was enclosed by expanded metal. The fish auction area was enclosed and enlarged and a cantilever pathway constructed at the side, with a rail for hand truck upon it.

Ellenborough Market. Roof and upright columns of main market were painted.

The old railings and gates were pulled down and a concrete, spiked fence with wooden gates was erected. Eating section. The whole roof is being renewed and Robertsons Ventilators installed.

Telok Ayer Market. A new rail and enclosure on Robinson Road side was necessary owing to road widening.

15 New Awnings and all chicks were renewed.

4 Vegetable stalls were repaired.

Meat stalls are in course of renewal.

Floor and roof repaired where necessary.

Orchard Road Market. The whole of the front facing Orchard Road was built in modern style, the flooring was relaid throughout and a new type of vegetable and fish slab erected. The roof was repaired where necessary and new awnings provided.

Grange Road Market. Flooring repaired. Will need renewal next year. All gates fencing and upright supporting columns were painted.

People's Park Hawkers Shelter. Three new fish slabs supplied and roofs and floors repaired where needed.

Kandang Kerbau Market. All meat tables were renewed. Five vegetable stalls were repaired. Seven new awnings supplied.

All Markets. The water and lighting services are maintained in working order by the respective departments, as requested.

UNSOUND FOODSTUFFS.

A total of 75,790 catties of unsound foodstuffs was surrendered and destroyed. Prosecutions were unnecessary.

PRICE AND QUANTITY OF FOODSTUFFS.

An increase in quantity in almost all recorded articles was noted, only poultry showing a decrease. Wet fish sales increased by over 900,000 catties the increase showing mostly in the Clyde Terrace, Kandang Kerbau and Orchard Road Markets. The commission on sales however dropped considerably, showing that the wholesalers' prices had dropped. Retail prices though slightly lower should, and I think will, fall in comparison when the public can no longer pay the fancy prices demanded.

REVENUE.

No.	Market.	1929. $	cts.	1930. $	cts.
1	Clyde Terrace	176,279	73	163,492	65
2	Ellenborough	117,015	90	108,947	37
3	Telok Ayer	29,213	94	29,290	31
4	Orchard Road	14,090	50	13,927	50
5	Kandang Kerbau	19,651	00	18,892	00
6	Grange Road	2,130	00	2,628	00
7	Geylang	3,979	00	3,919	00
8	Maxwell	11,904	00	449	00
9	Peoples Park Hawkers Shelter	13,889	00	14,176	00
10	Joo Chiat	3,120	00	3,350	00
11	Sims Avenue	Nil.		1,345	00
	Total ...	$371,440	77	$360,416	83

Maxwell Market was so poorly patronised that it was decided to forego collection of rents until such time as business improved.

5% COMMISSION.

Market.	1926.		1927.		1928.		1929.		1930.	
	$	*cts.*	$	*cts.*	$	*cts.*	$	*cts.*	$	*cts.*
Clyde Terrace ..	106,072	52	122,158	66	107,983	64	120,051	96	110,660	65
Ellenborough ..	76,598	76	77,826	82	75,703	26	71,866	59	64,071	37
Telok Ayer ..	2,971	21	2,769	47	2,330	87	1,903	30	1,462	31
	$185,642	49	$202,754	95	$186,017	77	$193,821	87	$176,194	33

The large drop in 5% Commission on fish sales as compared with the increase in quantity sold proves that the retail prices do not reflect the true state of affairs and that the public are being exploited.

UNSOUND FOODSTUFFS.

75,790 catties were destroyed as unfit for human consumption. When daylight killing of pigs was introduced and consequent chilling of the pork before sale an uproar was created owing to alleged bad keeping qualities of the chilled pork. Many experiments were carried out and after certain faults were remedied the opposition died down and it is now admitted that the public prefer the chilled pork. There is no gainsaying the fact that the pork now being sold is perfectly fit and wholesome.

STAFF.

One new Market Keeper and 6 new coolies and one Jaga were taken on for the Sims Avenue Market which was opened in September.

Market Keeper de Silva's services were dispensed with in February.

Market Keeper Bodestyne was granted 14 days' local leave in November.

Three Market Keepers reported sick and were treated by M.O. in-charge of Staff.

58 coolies also reported sick during the year, some were sent to hospital for treatment, others given medicine and all have resumed work.

TOWN.

11,210 cases, tins etc. of unsound foodstuffs were collected from various stores and destroyed at the incinerator.

I attach the usual returns and tables in connection with my duties.

I have the honour to be,

Sir,

Your Obedient Servant,

M. MacMAHON,

Cert. R. San. Inst.,

Food and Market Inspector.

	Terrace.		borough.		Ayer.		Road.		Kerbau.		Maxwell.		Geylang.		Chiat.		Road.		Park.		Licences issued	
	No.	$	No.	$	No.	$	No.	$	No.	$	No.	$	No.	$	No.	$	No.	$	No.	$	No.	$
Dry Goods ..	55	30	31	30	9	30	7	30	7	30	2	Free.	14	5	12	10	7	5	..	..	2	10
Beef ..	21	15	1	15	3	15	6	15	7	15	3	,,	1	10	1	10	4	5	4	15	..	..
Salted Veg: ..	6	15	4	15	4	15	1	15	1	15	2	,,	2	10	1	10	1	5	13	5	2	10
Mutton ..	6	12	..	..	5	12	2	12	8	12	1	,,	..	..	..	..	..	..	..	..	..	..
Pork ..	13	15	22	15	6	15	10	15	15	15	4	,,	11	10	3	10	3	5	19	15	1	10
Curry Stuff ..	4	10	1	10	1	10	1	10	2	10	2	,,	1	5	1	10	1	5	1	5	1	10
Bean Cakes ..	6	6	11	6	1	6	3	6	2	6	6	,,	..	..	1	5	..	..	13	5	..	..
Poultry ..	16	15	15	15	6	15	6	15	4	15	4	,,	..	..	..	..	1	2	22	2	..	..
Veg: and Fruits ..	72	10	64	10	78	10	50	10	61	10	47	,,	..	..	1	10	10	3	112	1	2	10
Eggs ..	8	5	9	5	1	5	1	5	..	..	5	,,	1	3	..	..	1	3	12	5	..	..
Money Changer ..	7	15	2	15	..	..	1	15	1	15	2	,,	..	..	..	..	1	5	1	5	2	10
Eating ..	..	..	14	30	16	30	..	..	..	..	..	..	..	..	..	..	..	..	36	5	..	..
Fish ..	150	5	105	5	31	5	36	5	36	5	62	Free.	21	3	16	5	8	3	46	5	16	5
Cold Storage Shell Fish ..	..	..	13	5	1	5	..	..	..	..	..	..	..	..	..	..	2	20	..	..	..	..
R. Duck Hawkers ..	1	15	38	10	9	10	2	10	3	10	Ice	,,	46	1	..	..	1	20	..	..	..	..
Provision Hawkers	2	10	..	..	21	7	..	..	..	..	..	..	..	..	..	..	1	5	6	5	..	..
Milk and Bread Hawkers ..	1	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dressed Duck ..																						
	368	..	330	..	192	..	126	..	147	..	141	..	97	..	36	..	41	..	285	..	26	..

Total .. $1,789

M. MacMOHAN,
Cert. R. San. Inspt.,
Food and Market Inspector.

SUMMARY OF VACANT STALLS END OF DECEMBER 1930.

	Clyde Terrace.	Ellen-borough.	Telok Ayer.	Orchard Road.	Kandang Kerbau.	Maxwell.	Geylang.	Joo Chiat.	Grange Road.	Peoples Park.	Sims Avenue.
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Dry Goods ..	5	..	6	3	..	10	5	5	..	..	6
Beef ..	3	..	..	..	..	11	1	4	2	1	6
Salted Vegetables ..	..	..	..	..	..	2	..	..	..	..	..
Mutton ..	1	1	..	1	..	3	..	1	2	..	2
Pork ..	2	..	4	1	..	18	1	3	1	..	5
Curry Stuff Bean Cakes ..	..	..	..	3	1	6	..	1	..	..	4
Poultry ..	8	13	2	..	..	16	..	..	..	2	6
Vegetables & Fruits	8	..	10	6	..	21	..	3	7	32	26
Eggs ..	..	..	..	3	..	1	..	..	..	..	4
Money Changer ..	..	..	..	..	..	..	..	..	..	..	..
Eating ..	..	..	3	..	2	..	..	..	..	12	..
Fish ..	14	2	4	4	..	2	..	20	4	2	12
Shell Fish ..	..	..	..	..	..	..	..	..	..	..	..
Hawkers ..	1	2	..	..	1	..	..	..	2	..	..
Provisions ..	8	..	..	..	..	..	..	..	1	..	..
Total ..	50	18	29	21	4	90	7	37	19	49	71
											395

M. MacMOHAN,
Cert. R. San. Inspt.,

RETURN OF SOME OF THE FOODSTUFFS PASSING THROUGH MARKETS.

Duriing the Year 1931.

Market.	Wetfish ctts.	Boiled fish ctts.	Sell fish ctts.	Beef ctts.	Mutton ctts.	Pork ctts.	HEADS						Bean cakes ctts.	Bean sprouts ctts.	Approximate Value.	
							Fowls	Capons	Geese	Ducks.	Pigeons.	Turkeys			$	cts.
Clyde Terrace ..	13,889,390	35,067	6,920	391,089	181,500	311,108	23,497	..	1,416	22,082	8,115	..	305,145	20,832	2,827,187	26
Ellenborough ..	5,084,848	19,957	336,000	22,198	2,011	807,104	39,365	919	3,505	40,028	..	..	181,010	36,310	1,957,775	00
Telok Ayer ..	109,562	..	40,860	37,747	84,441	204,606	54,175	..	449	23,067	3,788	153	..	..	314,778	16
Kandang Kerbau ..	1,186,531	71,870	40,999	266,683	121,884	488,333	68,263	282	80	11,441	205	..	48,970	55,608	577,760	79
Orchard Road ..	619,977	46,735	..	164,824	17,904	301,896	44,402	162	28	6,356	5,887	6	4,197	5,682	449,496	72
Rochore ..																
Total ..	20,890,308	173,629	424,779	882,491	407,740	2,113,047	229,702	1,363	5,478	102,974	17,995	159	539,322	118,432	$6,126,997	93

M. MacMOHAN,

Cert. R. San. Inspt.,

Food and Market Inspector.

UNSOUND FOODSTUFFS DESTROYED.

During the Year 1930.

Market.	Wetfish ctts.	Saltfish ctts.	Beef ctts.	Mutton ctts.	Pork ctts.	Vegetables ctts.	Fruits ctts.	Tinned Goods.		Bottles preserves No.	Eggs No.	Miscellaneous.	Total Items.
								Cases.	Tins.				
Clyde Terrace ..	6,919	893	118	..	24	13,780	3,424	..	..	..	2,154	190	
Ellenborough ..	2,037	956	..	..	222	1,739	388	..	22	..	712	1,214	
Telok Ayer ..	19	..	..	..	1	13,148	5,104	..	240	..	259	..	
Kandang Kerbau ..	588	..	25	4	119	2,742	609	..	16	..	30	4	
Orchard Road ..	372	8	12	3	287	5,685	5,141	..	..	..	66	88	
Other Markets ..	988	167	1	..	64	2513	1,982	..	52	..	522	139	
	10,923	2,024	156	7	717	39,607	16,648	..	330	..	3,743	1,635	75,790
Town ..	..	..	..	..	..	..	1,830	1,768	7,499	110	..	3 sheep	11,210
Total ..	10,923	2,024	156	7	717	39,607	18,478	1,768	7,829	110	3,743	1,638	87,000

M. MacMOHAN,
Cert. R. San. Inspt.,
Food and Market Inspector.

HEALTH DEPARTMENT.

Return of Prosecutions for the Year 1930.

OFFENCES.		Division (South) Districts.					Division (North) Districts.				
		TOTAL.					TOTAL.				
		Prose-cutions.	With-drawn.	Not Served.	Con-victions.	Fines.	Prose-cutions.	With-drawn.	Not Served.	Con-victions.	Fines.
Municipal Ordinance 135.											
Obstructions	Section 116	...	...	...	...	...	...	...	...	...	...
Offensive matter flowing into Public Drain ...	„ 127	...	...	...	...	...	...	...	...	...	...
Establishing a private market	„ 191	...	...	...	...	...	1	...	...	1	1.50
Unlicensed Offensive Trades	„ 204	27	2	7	18	265.50	46	9	8	29	391.00
Using nightsoil/or urine as manure	„ 206	7	...	...	7	145.00	7	...	...	7	9.50
Latrine etc. notice not complied with ...	„ 212	1	1	...	...	...	3	...	1	2	...
Nightsoil kept for more than 48 hours ...	„ 216	1	...	...	1	9.50	5	...	...	5	58.50
Filthy premises	„ 226	18	3	...	15	110.50	90	5	6	79	850.50
Limewash notice not complied with	„ 227	...	...	...	...	...	1	...	1	...	...
Non-compliance of notice for the destruction of rats and mice	„ 228	...	...	...	...	...	...	...	...	...	...
Non-compliance of notice of demolition order of insanitary dwelling	„ 229	...	...	...	...	...	7	...	...	7	72.00
Carried Forward	...	54	6	7	41	$ 530.50	160	14	16	130	$1,383.00

HEALTH DEPARTMENT.

Return of Prosecutions for the Year 1930.—*(contd.)*

OFFENCES.		Division (South) Districts.					Division (North) Districts.				
		TOTAL.					TOTAL.				
		Prosecutions.	Withdrawn.	Not Served.	Convictions.	Fines.	Prosecutions.	Withdrawn.	Not Served.	Convictions.	Fines.
Brought Forward ...		54	6	7	41	$ 530.50	160	14	16	130	$1,383.00
Allowing premises to be overcrowded ...	„ 230	...	...	...	...	...	...	...	...	...	...
Non-compliance with Nuisance Notice ...	„ 239	12	1	2	9	41.00	69	6	5	58	82.50
„ „ „ Order ...	„ 240	2	...	...	2	3.50	1	...	...	1	4.50
„ „ Closing Order ...	„ 240	...	...	...	...	...	...	...	...	...	...
Non-compliance of order for demolition of house unfit for human habitation ...	„ 241	...	...	...	...	...	...	...	...	...	...
Non-compliance with Well Notice	„ 247	2	...	...	2	4.50	1	...	...	1	...
Opening Well without permission	„ 247	1	...	...	1	...	5	2	...	3	2.50
License not exhibited	„ 371	...	...	...	...	...	1	...	...	1	3.00
Byelaws-Sections 57 & 204 M. O. 135.											
Unlicensed Foodshops	...	529	80	150	299	2,699.50	878	128	231	519	3,976.00
Carried Forward ...		600	87	159	354	$3,279.00	1,115	150	252	713	$5,451.50

HEALTH DEPARTMENT.

Return of Prosecutions for the Year 1930.—*(contd.)*

OFFENCES.	Division (South) Districts.					Division (North) Districts.				
	TOTAL.					TOTAL.				
	Prosecutions.	Withdrawn.	Not Served.	Convictions.	Fines.	Prosecutions.	Withdrawn.	Not Served.	Convictions.	Fines.
Brought Forward ...	600	87	159	354	$3,279.00	1,115	150	252	713	$5,451.50
Unlicensed Milk Vendors	1	...	...	1	5.00	13	...	...	13	180.00
Recovery of Daily fines	171	21	80	70	1,196.50	118	24	38	56	1,431.50
Employing women without permission of H. O.	...	...	...	...	...	...	...	...	...	...
Breaches of the Piggery Byelaws	...	...	...	...	...	...	...	...	...	...
Unlicensed Piggeries	52	1	29	22	72.50	27	2	4	21	278.00
Filthy Stables, Cowsheds, etc.	3	...	...	3	15.00	2	...	...	2	7.50
Breaches of the Foodshop Bylaws	33	...	3	30	172.50	42	4	7	31	164.50
Markets and Slaughter Houses.										
Selling vegetables within 50 yards of market Section 186	1	1	...	...	...	...	...	...	...	...
Unsound Food ... ... „ 192	...	...	...	...	...	3	...	1	2	54.00
Carried Forward ...	861	110	271	480	$4,740.50	1,320	180	302	838	$7,567.00

HEALTH DEPARTMENT.

Return of Prosecutions for the Year 1930.—*(contd.)*

OFFENCES.		Division (South) Districts.					Division (North) Districts.				
		TOTAL.					TOTAL.				
		Prosecutions.	Withdrawn.	Not Served.	Convictions.	Fines.	Prosecutions.	Withdrawn.	Not Served.	Convictions.	Fines.
Brought forward ...		861	110	271	480	$4,740.50	1,320	180	302	838	$7,567.00
Slaughtering Animals except in Abattoirs ... ,,	197	2	...	...	2	124.00	22	...	12	10	158.00
Market Byelaws	...	...	...	...	...	...	...	...	...	...	...
Sale of Food and Drugs Ordinance No. 139.		...	...	...	...	...					
Selling Adulterated Milk ... ... Section	11–1	...	...	...	...	...	21	4	2	15	470.00
,, ,, Whisky ... ... ,,	11–1	...	...	...	...	...	1	...	...	1	74.50
,, Powder Adulterated with Lead ...		6	6	...	...	...	1	...	...	1	...
Q. and P. Disease Ordinance No. 157.											
Failing to report case of Inf. Disease ... Section	3	...	...	...	...	...	...	...	...	...	...
Moving patient without permission ... ... ,,	15	...	...	...	...	...	...	...	...	...	...
Exposing patient while suffering ... ... ,,	15	...	...	...	...	...	...	...	...	...	...
Conveying patient in public vehicle ... ... ,,	19	...	...	...	...	...	...	...	...	...	...
Carried forward ...		869	116	271	482	$4,864.50	1,365	184	316	865	$8,269.50

Return of Prosecutions for the Year 1930.—*(contd.)*

OFFENCES.	Division (South) Districts.					Division (North) Districts.				
	TOTAL.					TOTAL				
	Prose-cutions.	With-drawn.	Not Served.	Con-victions.	Fines.	Prose-cutions.	With-drawn.	Not Served.	Con-victions.	Fines.
Brought forward ...	869	116	271	482	$4,864.50	1,365	184	316	865	$8,269.50
Failing to have child vaccinated ... ... ,, 31	87	7	15	65	4.50	111	13	16	82	9.00
,, ,, bring child for inspection ... ,, 32	...	...	...	...	...	...	...	...	...	...
Registration Births and Deaths Ordinance No. 59.										
Failing to Register Births ... ... Section 11	20	1	...	19	2.00	23	2	...	21	4.50
,, ,, ,, Deaths ... ... ,, 11–1	...	...	...	...	...	...	...	...	...	...
Destruction of Mosquitos Ordinance No. 174.										
Failing to comply with notice ... ... Section 1–8	1	...	...	1	.50	3	1	...	2	5.00
Recovery of costs of work done ... ... ,, 7–1	...	...	...	...	...	...	...	...	...	...
Destroying Anti-malarial Works ... ... ,, 14	1	...	...	1	30.00	...	...	...	...	...
Failing to appear in answer to summons ...	1	...	...	1	10.00	...	...	...	...	...
Selling Food at an Unlicensed Market ...	24	2	8	17	...	12	8	3	1	1.50
Refusing to sell milk for the purpose of Analysis	...	...	...	...	...	1	...	...	1	24.50
	1,003	126	291	586	$4,911.50	1,515	208	335	972	$8,314.00

Summary.

Total Inspections	42,676
,, Prosecutions	2,518
,, Withdrawn	334
,, Not Served	626
,, Convictions	1,558
,, Fines	$13,225.50

H. J. BENJAFIELD,
Chief Sanitary Inspector.

N.B.—Costs are not included in the amount of fines.

Return of Notices Served and complied with etc., during the Year, 1930.

NATURE OF NOTICE.	Brought forward from last year.	Served during the year.	Total.	Complied with during the year.	Carried forward to next year.	REMARKS.
Intimation Notice	128	588	716	572	47	97 (Cancelled)
Limewash Notice	102	2,656	2,758	2,431	308	19 do.
Nuisance Notice	10	150	160	92	11	57 do.
Demolition Notice	2	...	2	1	...	1 do .
Drain Notice	1	4	5	4	...	1 do.
Well Notice	1	158	159	147	8	4 do.
Antimosquito Notice	186	709	895	559	332	4 do.
Latrine Notice	...	9	9	9	...	... do.
Abatement Order	...	42	42	22	...	20 do.
Total ...	430	4,316	4,746	3,837	706	203 (Cancelled)

H. BENJAFIELD,

Chief Sanitary Inspector.

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases during the Year 1930.

Date.	Name.	Address.	By whom Arrested.	Offence.	By whom Tried.	Results.	Remarks.
21/2/30	Mahadeo Singh ...	12 Desker Road ...	P. C. 997	Selling milk without a licence	2nd Magst.	Fined $ 20.00	
27/2/30	Bisnathrai ...	80 Mc. Pherson Road ...	P. C. 413	do. do.	do.	,, 25.00	
do.	Parsotum ...	Geylang ...	P. C. 413	do. do.	do.	,, 25.00	
do.	Samykanno ...	289 Frankel's Estate	P. C. 917	do. do.	do.	...	Discharged.
28/2/30	Bini Paray ...	80 Dunlop Street ...	Insp. Mitra	do. do.	do.	Fined $ 5.00	
do.	Malic Singh ...	Meyer Road ...	P. C. 467	do. do.	do.	,, 15.00	
do.	Lurku ...	74 Dunlop Street ...	do.	do. do.	do.	,, 5.00	
do.	Sipayan ...	Shanghai Road ...	do.	do. do.	do.	,, 5.00	
6/3/30	Leow Guay ...	17 Ramah Street ...	P. C. 467	Failing to appear in answer to a summons ...	3rd Magst.	,, 10.00	Warrant No. 3 Summons Case No. 243.
20/3/30	Malic Singh ...	5½ M. Changi Road ...	P. C. 1123	Selling milk without a licence	do.	,, 25.00	
do.	Maharahi ...	74 Dunlop Street ...	do.	do. do.	do.	,, 5.00	
do.	Jurganath ...	339 Serangoon Road ...	do.	do. do.	do.	,, 5.00	
21/3/30	Boolay Guala ...	47 Dunlop Street ...	P. C. 87	do. do.	4th Magst.	,, 20.00	
do.	Guljar Guala ...	... ...	Insp. Mitra	do. do.	2nd Magst.	,, 20.00	
				Carried	*forward* ...		

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases during the Year 1930.—*(contd.)*

Date.	Name.	Address.	Arrested. By whom	Offence.	By whom Tried.	Results.		Remarks.
				Brought	*forward* ...			
17/7/30	Marjit Singh ...	... ...	P. C. 786	Selling milk without a licence	2nd Magst.	Fine	$ 10.00	
14/7/30	Menasah Rai ...	... ...	P. C. 1177	do. do.	do.	,,	10.00	
24/7/30	Soolesah ...	31 Mc. Pherson Road ...	P. C. 1419	do. do.	do.	,,	25.00	
24/7/30	Chatterji Singh ...	71 Dunlop Street ...	P. C. 1163	do. do.	do.	,,	3.00	
30/7/30	Nannoor ...	Nil Lorong 3 East Coast	P. C. 1311	do. do.	do.	,,	25.00	
9/9/30	Bansoor Singh ...	78 Dunlop Street ...	...	do. do.	do.	,,	20.00	
do.	Mahabdee Guala ...	145 Syed Alwee Road	...	do. do.	do.	,,	30.00	
do.	Subedar Singh ...	79 Dulop Street ...	P. C. 98	do. do.	3rd Magst.	,,	5.00	
do.	Beichu Missir ...	78 Dunlop Street ...	P. C. 98	do. do.	do.	,,	5.00	
8/12/30	Chatalpathy ...	Nil Up. Serangoon ...	P. C. 317	do. do.	2nd Magst.	,,	15.00	
do.	Nauroon ...	Lorong 3 East Coast ...	P. C. 1184	do. do.	do.	,,	10.00	
do.	Rambroot Singh ...	Lorong 31 Geylang ...	P. C. 317	Failing to carry milk sellers' licence ...	do.	,,	3.00	
					Total	fine	$346.00	

H. BENJAFIELD,
Chief Sanitary Inspector.

RETURN OF LICENCES (OFFENSIVE TRADES) ISSUED DURING THE YEAR 1930.

Nature of Licence.	Number issued.	Amount		REMARKS.
		$	*cts.*	
Blachan Store	10	240	00	
Brick Kiln				
Dye House	7	84	00	
Drying and Sorting Fish	5	60	00	
Fish Curing				
Fruit Preserving	4	200	00	
Knacker's Yard				
Lime Making				
Lye Making				
Laundry	349	349	00	
Offal Boiling				
Pottery Works				
Private Market				
Rags and Bones Store				
Sago Factory	4	200	00	
Sheep or Goat Pens	2	24	00	
Sugar Boiling	5	250	00	
Soap Boiling	7	72	00	
Tannery	8	400	00	
Cowsheds	2	75	00	
Cattle Sheds	21	686	00	
Pony Stables	5	50	00	
Piggery				
	429	$2,690	00	

H. BENJAFIELD,
Chief Sanitary Inspector.

BUREAU OF HYGIENE
LIBRARY
7 SEP 1931
& TROPICAL DISEASES